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Water Politics: Governance, Conflict, and Vulnerability in Andean Peru

Flavia Rey de Castro Pastor
Syracuse University

Abstract:

Peru is facing serious social and environmental water challenges. Experts and policy makers are trying to better understand the social and economic impacts of an increasing rate of glacial melt and a consequential prospect of water scarcity. Currently there is a great deal of strain put on the water resources originating from Andean glacial melt because these sustain most economic and social growth taking place at the coastal desert. At the same time, the country's neoliberal development policies are changing the management of resources such as water. The gradual expansion of extractive industries along with the growing influence of non-state actors is introducing new discursive representations of the environment and facilitating important changes in the spatial, administrative, and political relations of governing nature. Among the most prominent changes are the recent restructuring efforts to the Peruvian institutional and legal structure for water governance. In this context, the forms of access, control, and exploitation of water in the Andes have become more contested than ever. This thesis explores the struggle for water at Parón, one of such Andean communities. This decade-long struggle for water perfectly demonstrates how local groups, government agencies, and a private corporation negotiate their access to water. This thesis explores how organizational structures, institutional arrangements, and decision-making processes shape and are shaped by access, use, management, and regulation of water in a conflictive environment. Particularly, it analyzes how politics informs water management, and consequentially affects access to the resource. But also, given the uniqueness of this conflict, this thesis further incorporates a risk and vulnerability factor to its analysis. While this conflict comprises the socioeconomic, political, historical, cultural, and environmental components of most environmental struggles in Peru, it also presents very unique characteristics. The contested water source is managed not only for downstream water use, but also for glacial risk mitigation. As such, this thesis examines how

water governance and vulnerability are co-produced in a conflictive environment. For this, I explore specific moments or instances – such as water flows and management, technology, institutions, discourses, and negotiations – that I recognize as embodying this relationship. In this analysis, I pay special attention to the impact of water technologies. I argue that a new, more convoluted, form of water politics – introduced to the watershed with hydropower technology – have created a new set of social relations that reinforce social vulnerability upon local water users, producing a transformation in vulnerability.

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by

Flavia Rey de Castro Pastor

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THESIS

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TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF ACRONYMS

ANA (National Water Authority)

ALA (Local Water Authority)

AAA (Administrative Authority of Water)

CEAS (Episcopal Commission of Social Action)

CEPES (Centro Peruano de Estudios Sociales)

CC (Constitucional Court)

COES (Comité de Operación Económica del Sistema Interconectado Nacional)

CODISPAS (Comisión Diocesana de Servicio Pastoral Social)

GLOF (Glacial Lake Outburst Flood)

IEP (Instituto de Estudios Peruanos)

INDECI (Instituto Nacional de Defensa Civil)

IRB (Institutional Review Board)

IWRM (Integrated Water Resources Management)

PE (Political Ecology)

PNH (National Park of Huascaran)

PL (Parón-Llullán watershed)

SEIN (Sistema Eléctrico Interconectado Nacional)

SPDA (Sociedad Peruana de Derecho Ambiental)

CHAPTER 1

INTRODUCTION: WATER GOVERNANCE, CONFLICT AND EQUITY IN PERU

SEIZING PARÓN

Pedro[1] travelled from Huaráz to Piura because he worried about his community's future. For almost two decades now, his people had been deprived of their water rights[2] (Defensoría del Pueblo, 2009). As the community's president, he worried that there was nothing he could do to change Cruz de Mayo's grim future. Ever since colonial times, *campesinos*[3] had been treated as second class citizens in Peru (Vera Delgado & Zwarteveen, 2008). This time it was no different. It was 2008 and it had been already twelve years since the government granted Lake Parón's water management to a private entity (Defensoría del Pueblo, 2009). The lake was the community's primary water source, and their claims to water rights were still unanswered. The community's irregular access to water was placing a serious strain on irrigators. It was near impossible to coordinate water use. This situation was generating internal conflicts, weakening the community's social ties, and diminishing the local crop yields - an urgent problem since Cruz de Mayo's population lives off of subsistence farming.

"As a *dirigente* (leader)" Pedro told me in one of our conversations "I didn't know what to do anymore!" So he embarked on a day-long journey to attend the workshop on water that the *Comisión Episcopal de Acción Social* or Episcopal Commission for Social Action (CEAS), was

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[1] With the exception of public officials, all names used in this thesis are fictional.

[2] I borrow from Boelens to conceptualize water rights. Thus, in my analysis I understand water rights as "authorized demands to use (part of) a flow of water, including certain privileges, restrictions, obligations, and sanctions accompanying this authorization, among which a key element is the power to take part in collective decision-making about system management and direction" (2002, p.3).

[3] Term used to refer to the indigenous group of people who speaks Quechua and who is a smallholder farmer whose identity is directly linked with his key subsistence activity (agriculture), and with the economic domination by a relatively powerful external group (Boelens et al, 2006).

hosting for the diocese.[4] As a catechist and as an indigenous community leader, Pedro had been invited to participate in this event, *Agua, Cultura y Gestión*, or water, culture, and management. Maria, an anthropologist working closely with the Cruz de Mayo community, explained to me that water, culture, and management were becoming contentious topics in Peru. At the time, the government was in the process of passing a bill that introduced a new water governance arrangement. The opposition feared it would favor private interests. In fact, the workshop's intention was to inform its participants of how this new arrangement could affect their access to water. Participants also discussed the Cochabamba case to reflect on how others had reacted to the government's attempts to favor the private sector.[5]

At the workshop, Pedro had learned that glaciers were receding, that their sole water supply was bound to diminish, and that their water rights were about to change. "After the workshop" Pedro told me "I realized the water problem in Parón was more complex than I imagined…" Having heard the case of neighboring Bolivia gave him hope though. "I realized" he said "I had to do something to change the situation!"

As Manuel sipped his coffee, he reflected on how to begin telling me where the Parón conflict began. It was a cool winter night in Caráz. Kids were running around the plaza and their mothers were chatting distractedly. I wondered how this town, as small as it is, remained so vibrant on a winter night. But Caráz is known in the region for having *clima templado* or temperate climate. As climate is so favorable in this area, conditions are ideal for agriculture and that was clearly manifested in the landscape. In the two hour journey from Huaráz to Caráz, crops changed as fast as altitude decreased (Figure 1). The landscape went from being dominated by *choclo*, or corn, at 3,000 meters above sea level (m.a.s.l) in Huaráz, to flowers, peaches and

[4] CEAS is the religious institution that has been most involved with Cruz de Mayo in helping them organize their position for the negotiations on the management of waters of Lake Parón.
[5] Refers to the water wars in Cochabamba, Bolivia, where a strong social movement was able to prevent the privatization of the municipal water supply's management (Perreault, 2005).

artichokes at 2,200 m.a.s.l in Caráz. Just as in Cruz de Mayo, most *Caracinos'*[6] livelihood is mainly dependent on agriculture.

"There were only two possible outcomes: we either save Parón and strengthen the community as we are already doing, or…I go to jail!" Manuel's narrative was strong and vivid. "When I became the leader of the *Michi Rumi*[7] irrigators committee, I realized the water problem in *La Campiña*[8] was larger than simple internal irrigators' mismanagements. The real problem was in Lake Parón. According to law, users should manage the water located in their jurisdictions. Then, why were the waters of Lake Parón being managed by a private company?"

Judging from interviews and later events, it appeared that Manuel was not the only one questioning Parón's water governance. Why had their access to water changed so drastically since Duke Energy began managing Lake Parón's waters? Was this just? Was this legal? After years of having no results from repeatedly complaining to the government, water-users started growing tired. "I met with Pedro and other representatives from Cruz de Mayo, Caráz, and Campiña several times to discuss our discontent with Duke Energy's water management practices" said Manuel "We were determined to remediate this situation and to decide on a strategy to make our voices heard." As he narrated his story he grew more and more excited. "*Señores!*" he said while appearing to become angry "since the authorities are just Duke Energy's puppets and we don't receive the attention we deserve, we should take control of Parón's waters!"

"It was July 27th, 2008 and no decision was made!" Manuel cried "I was determined to rush the verdict…" he looked at me intensely for a moment before he began reenacting the days

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[6] Term used to refer to those who are from Caráz.

[7] Michi Rumi, or Mishirumi, with over nine kilometers long, is the longest canal in the area, which according to the latest water management report conducted by the Ministry of Agriculture provides water to 1,200 users.

[8] PL residents refer to the area that surrounds Caráz as La Campiña. This area is mainly composed of agricultural fields. Most farmers in this area grown crops for local and national commerce. For more information refer to stakeholder analysis section in Chapter Three.

that gave him fame "*Amigos*" he narrated passionately "tomorrow is the 28th and it might be the last time I can celebrate a holiday[9]… If death awaits on the 29th, I will be satisfied!" And he continued 'With or without you, I will seize the lake on the 29th!'

It was 2:00 a.m. on the 29th and Manuel's alarm went off. He began packing his bag with "everything!" as he described it: "pills, snacks, water, first aid supplies…" So he got on his motorcycle and left for the meeting point. It was a three hour ride up the mountain (see Figure 2). "As I rode on the winding road, my mind was racing!" he told me excitedly "I wondered about many different things: if there would be anyone waiting for me, how would they go about occupying the lake? or if this would be my last day alive..."

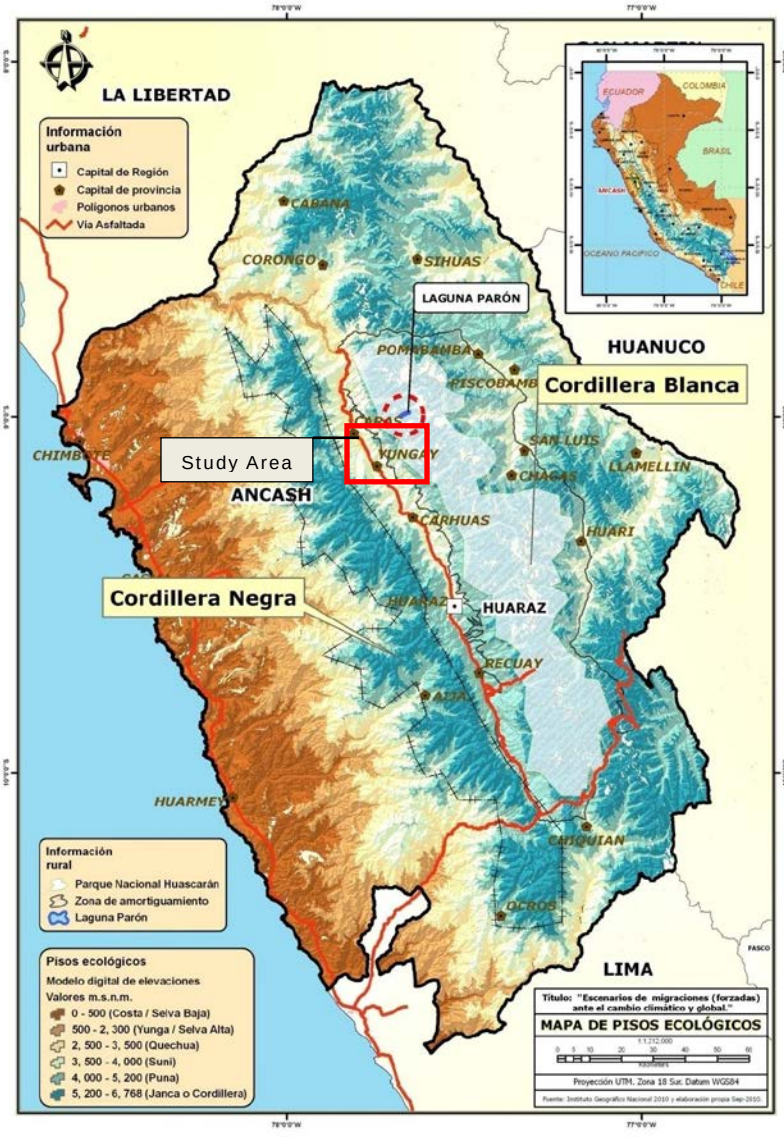

Figure 1: Topographic map of Ancash**. Note:** altitudes are depicted in meters
Source: Altamirano, 2012.

At 4,200 meters above sea level, glacial lake Parón provides drinking water for approximately 25,000 people in the town of Caráz and the surrounding agricultural area of

[9] July 28th is the Peruvian Independence day.

Campiña (INEI, 2009b), almost 600 people in the campesino community Cruz de Mayo, as well as irrigation water for small, medium, and large scale farmers. These waters then feed into the Santa River, and are used for hydroelectric generation at Cañón del Pato, or Huallanca (see Figure 2). During the mid 1990s the government authorized Egenor, a Duke Energy subsidiary, to manage the Cañón del Pato hydroelectric plant. As part of the negotiation Duke was entitled to use water from Parón (field notes, 2010). The use of Parón waters for electricity generation has been challenging for downstream user groups since Egenor's water releases reduced the supply for the town of Caráz and was incompatible with the irrigation needs of the local communities (Peralta, 2010).

It is precisely the opposing needs and uses of water among different user groups in the Parón-Llullán watershed (PL), along with the oppression that Duke's water use implied for local user groups, that initiated the Parón water conflict. At the heart of this conflict is not only water governance, but also vulnerability. As a population that mostly depends on agriculture, PL residents were socially made vulnerable by the lack of reliable access to water.[10] However, their vulnerability is not only socially induced, it is also environmentally induced. The *Cordillera Blanca* is a disaster-prone area.[11] In addition to being susceptible to earthquakes, because of the instability of its surrounding glacial lakes, is highly vulnerable to glacial lake outburst floods[12] (GLOF). Hence, the management of Lake Parón waters is crucial to the production of vulnerability. As this thesis discusses, this conflict, and the lake's water governance

[10] In this thesis, I conceptualize access as the ability of a community to benefit from a resource. This is a dynamic term that depends on specific social and environmental processes. Borrowing from Ribot and Peluso's (2003) framework, I view access as generating from a series of means, processes, and relations within society that are simultaneously shaped by structural and relational processes such as technology, capital, social relations, markets, labor, knowledge, authority, and identities. Furthermore, much like Langridge et al. (2006), I recognize that 'opportunities for access are [also] facilitated…by the geographic location, climate of a region and the ecological integrity of the resource base' (p. 155).

[11] Cordillera Blanca is a mountain range in Peru that encompasses 260 glaciers. Parón is one of many lakes that have formed in this area as a result of melting glaciers (Portocarrero, 1995). Lake Parón's geography is further explained in Chapter Two.

[12] A glacial lake outburst flood is a high-magnitude flood that occurs when the pressure of the lake's water or the collapse of glacial ice cause the dam containing a glacial lake to fail (Bradley et al, 2009; Carey, 2010).

arrangement, shapes and is shaped by vulnerability.

Figure 2: Research area. The most important areas for my research were (1) Lake Parón; (2) Cruz de Mayo; (3) Campiña; (4) Caráz; (5) Huallanca (Location for Cañón del Pato, and Duke Energy). **Note:** This map illustrates only the general position of boundaries.

WATER VULNERABILITY: A NEW VULNERABILITY LANDSCAPE, CHANGING GOVERNANCE ARRANGEMENTS, THE MEANING OF PARÓN'S SEIZING, AND RESEARCH QUESTIONS

Having the largest concentration of glaciers in the country, inhabitants of towns adjacent to the Cordillera Blanca, especially those along the rivers that descend from the glaciers, face a serious risk of outburst floods (Chuquisengo & Ferradas, 2007). Experts have qualified this region as one that clusters the largest number of risks in the whole nation (Portocarrero et al., 2008). To make matters worse, during the past s7666666everal decades, an increasing rate of glacier melt has led to "a massive increase in the number of … glacial lakes: from 223 in 1950, to 314 in 1983, to 347 in 1997" (Carey, 2008, p. 185), a trend that further increases the risk of outburst floods in the area.

As a disaster-prone area, Cordillera Blanca has been witness to several outburst floods

that have claimed a number of lives. Just to name a few, in 1941 a GLOF in Huaráz, the capital city of Ancash department, killed approximately 5,000 people; In 1945 another flood claimed five hundred lives in Chavín; In 1950, the Cañón del Pato hydroelectric plant was completely destroyed by torrential waters from a glacial flood; And in 1970, 15,000 people were killed by another disaster in nearby Yungay (Carey, 2008). To prevent these types of incidents, in the 1940s the Peruvian government began a series of glacial studies that led to "lake security projects". These projects represented a significant shift in the government's approach on the disaster prevention agenda. Rather than mitigating risks through hazard zoning, government experts began draining and damming glacial lakes. By the 1960s more than 40 glacial lakes had been contained (Portocarrero C., 1995). These efforts, at the same time, were believed to provide a unique opportunity to use water for development. As early as the 1940s, experts believed that disaster prevention could be combined with hydroelectric generation. With time, hydroelectric and irrigation interests have become more and more influential on the Cordillera Blanca's disaster management agenda (Carey, 2008). Even though this particular approach went largely unquestioned in Peru (except for a few scholars, see Carey et al., 2012; Lynch, 2012), combining disaster management with hydroelectric generation has transformed, and even intensified, the vulnerability that local residents and water users experience. Siding with this point of view, I argue that, since then, vulnerability became mainly driven by social factors - particularly, the lack of secure access to water - rather than the risk of exposure to a natural disaster.

Social scientists studying vulnerability in the Cordillera Blanca area associate it with watershed governance. In particular, they relate it to the ways in which the interests of communities, their livelihoods and ecosystems, are represented in the allocation and management of water (Bury et al., 2011; Lynch, 2012). The seizing of lake Parón was a clear

response to a perceived direct threat to people's livelihoods. Scholars often times connect the threat to rural livelihoods in Peru to development efforts (Bebbington & Bebbington, 2011; Grompone, 2009; Vera Delgado & Zwarteveen, 2008). The conflict in Parón unfolds in a context of historical grievance against centralized economic and political interests. For PL residents, the very water management regime that 'secured' them from the risk of outburst floods began appearing a gimmick that only sacrificed their access to water to secure the hydroelectric plant's use.

Today, the vulnerability experienced by PL residents and water users is transforming constantly because the management of Parón's waters has become heavily politicized. As water users begin to face the responsibilities included with the management of the lake, and as they attempt to negotiate a water governance plan, the risk of GLOF they are exposed to and the prospects for a secure access to water are constantly changing. Pointing to the politics and struggle for access to the resource this thesis explores the conflict in Parón. In addition to examining the historically contingent development of its water governance, this thesis explores the unique ways in which water governance arrangements shape and are shaped by both access to water and the risk of GLOF. In particular it asks, *in what ways do water governance and vulnerability co-produce each other?*

METHODOLOGY

Fieldwork for this thesis consisted of two consecutive summers in Peru. Trying to prepare to research the social effects of climate change in the Cordillera Blanca area – my intended topic of research - I read as many publications as I could prior to arriving to the country on my first visit (Bury et al., 2011; Portocarrero, 1995; Urrutia & Vuille; 2009; Young & Lipton; 2006). I also spent some time online searching for institutions that worked on topics related to climate

change in Andean Peru. I compiled a list of organizations that I wanted to reach out to. Ideally, I would connect with governmental, non-profit and research organizations. With a list in hand, and a clear idea of what I was looking for, I reached out to acquaintances to get connected to employees from these organizations. At times, this strategy worked, and I was introduced via email to people I interviewed once in Peru. I also contacted professionals I had not previously met; however, I never heard back from anyone whom I was not referred to by an acquaintance.

On my first visit, during the summer of 2010, I spent three weeks in Lima connecting with non-profits, research institutes with projects in Huaráz, and government agencies. Having already established a couple of connections before arriving allowed me to start my field work on a positive note. Except for once, the interviews I was able to schedule were limited to those institutions where I got introduced by acquaintances. I met with a lawyer from the *Autoridad Nacional del Agua*, or National Water Authority (ANA),[13] and a private practice lawyer specializing in water. My aim was to understand the 2009 *Ley de Recursos Hídricos* or Water Resources Law.[14] To become familiar with critical understandings of the law I approached the *Centro Peruano de Estudios Sociales* or Peruvian Center for Social Studies (CEPES). Even though I was unable to connect with a water rights specialist, I interviewed an anthropologist to better comprehend natural resource use and distribution. I also interviewed an independent researcher who studies climate change in the Andes. He introduced me to the climate change debate in Peru, and directed me to scientists in Huaráz that ended up being central for my research. Even though not all interviews I conducted were directly related with my initial topic or area of research, I found them to be useful because through them I was able to re-direct and

[13] The National Water Authority is the governmental institution in charge of design and implementation of water policies, as well as enforcement of regulations for water use and distribution (Autoridad Nacional del Agua, 2009a). For more information on this institutions refer to stakeholder analysis section in Chapter Three.

[14] The Water Resources Law passed in 2009, its regulation passed in 2010. Today, it is only beginning to be implemented throughout the country. For more detail see Chapter Two.

focus my research topic to what it is today.

In addition to interviews, I spent my time in Lima gathering documents from social and environmental research institutes. I visited the libraries of the *Sociedad Peruana de Derecho Ambiental*, or Peruvian Society of Environmental Rights (SPDA), *Instituto de Estudios Peruanos*, or Peruvian Studies Institute (IEP), and CEPES. Being aware that my topic of research would probably change, I downloaded and photocopied anything I found in relation to climate change and livelihoods in the Andes (i.e. critiques and evaluations of legislation and policies, reports on development projects for adaptation, reports on agriculture and the use of water in the Andes).

I spent the remainder of my summer in the department of Ancash, more specifically, in the cities of Huaráz and Caráz. Thanks to the help of personnel at *Parque Nacional de Hascarán* or Huascaran National Park (PNH),[15] I was promptly able to pinpoint my research area to the PL watershed - which includes the communities of Caráz, Campiña, and Cruz de Mayo – and to identify and contact the organizations I needed to talk to. I conducted interviews with key decision makers from different public and non-profit entities including *Administración Local del Agua*, or Local Water Administration (ALA); Glaciología; *Comisión Diocesana de Servicio Pastoral Social*, or Diocesan Commission of Pastoral Social Service (CODISPAS); the Regional Government of Ancash; *Instituto Nacional de Defensa Civil* or National Institute of Civil Defense (INDECI); And the Municipality of Caráz.[16] My aim with these interviews was to uncover the local perception on the effects of climate change, and to unpack discourses regarding the use of and access to waters from lake Parón; However, all interviews would end up in a discussion about the conflict over lake Parón's water governance. Stakeholders I interviewed

[15] PNH is located within the Cordillera Blanca and its mission is to protect all glaciers and biodiversity (UNESCO, 2007). Lake Parón is located within the park's territory. For more information on PNH refer to stakeholder analysis section on Chapter Three.
[16] For information on these organizations refer to stakeholder analysis section on Chapter Three.

seemed more anxious to talk about the conflict and governance issues than about climate change. In the end, I found myself researching and asking more questions about the conflict itself rather than climate change. This was a clear signal that I had found a new research interest. So when I went back to the field in July 2011, I had a new topic, water governance.

During my second year of fieldwork, 2011, I was in Peru for six weeks. This time, unlike the previous year, I spent most of my days in Huaráz and Caráz. Reflecting on my first year of research, I realized that my time would have been better spent if I had visited Ancash first. My idea was that after uncovering the specific details about the conflict in Ancash, I would be better able to identify how the conflict connects with conversations about water rights in Lima. Since I already knew the conflict, in addition to trying to understand the ways in which it had evolved, I wanted to examine the channels and effectiveness of communication between government institutions, the irrigators' governance arrangements and the ways in which they organize water distribution, and the flaws in the implementation of the 2009 Water Resources Law. Particularly I wanted to understand how integrated water resources management (IWRM) looks like on the ground.

Once in Ancash, in addition to re-connecting with interviewees from my previous visit, I was able to meet with a few additional people. I arranged two interviews with representatives from Duke Energy. I was also able to connect with the president of Cruz de Mayo and a *comunero*.[17] Unlike my previous visit, in addition to interviewing decision makers, I also talked to irrigators and residents. The information gathered from these interviews was eye opening to me, because I heard a completely different narrative of the conflict. In Lima, my fieldwork was quite different from the previous year. Rather than researching the 2009 water law, I was

[17] In the area, locals refer to those who live in communal land as comuneros. In this case, the term refers to a Cruz de Mayo resident.

determined to understand social conflicts in Peru and the role of the government in these. With a completely different set of questions, I visited ANA again. I also interviewed a private consultant specializing on social conflicts, and a social scientist from IEP.

Going to the field on two separate occasions proved quite advantageous because I was able to see and live the progression of the conflict. With this opportunity, I was able to understand how dynamic conflicts are, and how the roles and importance of stakeholders transform as time passes. In addition, I was able to acknowledge how inter-personal/inter-group dynamics, discourses, and interests shifted as the conflict progressed. Reflecting on and comparing my field notes from my first and second visit, and acknowledging that the conflict changed tremendously, I would argue that my narrative, and view of the conflict, would have been different if I had visited the field on only one occasion. It appears to me that on the course of the year between my first and second visits the conflict escalated dramatically and the stakeholder's willingness to solve anything waned. While during my first visit I noticed different user groups vigorously defending their positions and trying to find an outcome, during my second visit all groups seemed tired and frustrated. They had stopped communicating, and appeared to feel animosity towards each other.

Being Peruvian was of great advantage to me while doing research, because as Sultana argues, 'conducting international fieldwork involves being attentive to histories of colonialism, development, globalization and local realities' (Sultana, 2007, p. 375). Even though I had never been in the area before doing fieldwork, I already was familiar with the culture, history, and social dynamics in smaller Peruvian Andean towns. I was also aware of the tacit norms of how to interact with interviewees (public officials and indigenous leaders). In addition, the network I already had from my hometown proved useful in finding contacts and maybe even determining

their willingness to help me. Before even arriving to Huaráz, I already had my lodging sorted out and some interviews scheduled.

Through these connections at home I met personnel at PNH. This institution was incredibly helpful during my time in Ancash. They facilitated my research, and through them I became familiar with the area. I learned about different indigenous communities, their livelihoods, and the challenges they face in interacting with other social actors and with the environment. As I preferred to study an agricultural community, I narrowed my study area to the PL watershed. PNH also granted me a space to work, informed me of relevant events, and provided me with transportation to these events when possible. In addition, and most important, through PNH I was also able to connect with key actors and decision makers in the area.

All in all, I conducted 21 interviews in 2010 and 20 in 2011. Of all these, I was able to record all but three of these interviews. Even though I also took notes during the interviews, most data I used were transcriptions either from interviews or impressions I recorded after the interview itself. While in some occasions I transcribed the interviews only a few hours after these happened, other times, due to lack of time or energy, I did this work once in Syracuse. While transcribing, I added my thoughts and comments with a different pen color.[18] Once I finished transcribing, I used open coding to identify different key themes for my writing (Emerson et al., 1995). Even though while writing this thesis, my research question shifted several times, my overall interests remained. Thus, I revisited my transcripts more than once, but I did not re-do the coding.

Ethics and Obstacles of Fieldwork

My second visit to the field was significantly more productive than my first one. In addition to spending my time more efficiently, thanks to my previous experience in the field, I

[18] Later on, these comments were incredibly helpful for developing arguments in my writing.

was better able to find the information I was searching for from my encounters with the locals. In addition, while transcribing during my first year I realized how, in order to conduct successful interviews, I needed to better distinguish when to conduct myself in a professional manner, and when to be more informal. In general, this depended on my perception of the interviewee's openness to build rapport. The vocabulary I used, the way I expressed myself, and how I interacted with interviewees changed accordingly. Particularly, I had difficulty conducting formal interviews with public servants because I sensed I was engaging in an unequal 'power dynamic' and that I was at a disadvantage. I learned to better deal with this challenge only once I validated myself as a researcher who is able to produce knowledge. Being equipped with self-confidence put me in a better position to face the 'power dynamics' that one encounters as a researcher in the field (Katz, 1994).

My perception of these power dynamics was shaped by my upbringing in a Peruvian society that I identify as strongly marked by gender and race inequality. Being that I grew up in Peru, I faced more than one interesting challenge during fieldwork. Similarly to other geographers, I struggled to find a distinction between 'home' and 'field' (Mullings, 1999; Sultana, 2007). Even though the field site was not located close to my home, and my upbringing took place in different socio-economical context (an urban city rather than a rural town), research participants and I had many common grounds. We had been affected by similar historical and political processes. As such, during fieldwork, I was constantly negotiating and changing my position. At times, I was an insider, others, I was an outsider, yet others, I was both (Mullings, 1999). As Sultana explains, "The ambivalences, discomfort, tensions and instabilities of subjective positions became important to be reflexive about and work through, where the contradictions in my positionality and in-between status had to be constantly reworked as I

undertook fieldwork" (2007, p.377). As such, the information I gathered and the findings I arrived to in this thesis are shaped by these dilemmas.

Even though I was aware of the differences and hierarchies in the field, I found it very difficult to accept and work with them. For instance, recognizing the power deriving from my educational background, and my language skills, I tried to hide it whenever possible. Even though it was probably implied that I spoke English when I introduced the university I was coming from, many times, I purposefully introduced the university by its name in Spanish hoping that it would be understood as a University in Peru. I was afraid that these privileges would place me in certain categories (such as a *gringa*[19]), or much worse, position me with ties to Duke Energy, the 'gringo' organization that many claim is has been using all the water. In my view, these connections would obstruct my entry to the local communities and diminish all possibilities to build rapport with the research participants.

In fact, I had difficulty building rapport with the indigenous representatives. During the summer of 2010, Pedro, Cruz de Mayo's president, did not trust me and stood me up continuously. Even though I tried to meet up with him several times, we never got together. My initial guess was that since at the time there was so much attention and effort put into the conflict, many residents were paranoid and saw all outsiders, especially 'gringos', as possible 'spies' from Duke Energy.[20] However, after reflecting on it, I realized that there could have been many reasons for this rejection. Talking to an outsider like me could possibly spark all sorts of rumors questioning his legitimacy as a leader. Also, it could have been that he was just too busy dealing with paperwork, trainings, meetings, and other commitments that were required of him to represent his people in the conflict.

[19] Gringo(a) is the word commonly used in Peru to denote white foreigners, commonly from the United States.
[20] On a few occasions, during interviews and interactions with PL residents, I heard people accusing other residents of being Duke Energy's spies.

My suspicions of the disadvantages of my educational background and language skills were proven wrong during my second year in Caráz. Ironically, I overcame this trust barrier with Pedro through my language skills. Pedro was fascinated and curious about English. He wanted me to teach him English. Unfortunately, this breakthrough happened towards the end of my stay so our interactions were few. I was able to gain insight to Cruz de Mayo's governance structure, land tenure, and water management systems. In addition, I learned about their perceptions on the conflict. However, this was from the leader's perspective. I wish I would have had the time to talk to water users in Cruz de Mayo to compare their narrative to the one given by leaders. This insight could have helped me identify additional factors shaping the vulnerability produced from the lake's seizing. In the case of Campiña it was surprising to me to find such a stark disconnect between decision makers' and irrigators' narratives.

Regardless of how difficult I found these obstacles to be, these do not compare to the ethical challenge I face up to this day. Having talked with almost all stakeholders, and having been perceived as a neutral person, I believe I posses more information on this conflict than anyone in the area does. Reflecting on Cahill's (2009) writings on participatory research, in which she frames research ethics as a "stance against neutrality" (p.50) and as "an existential commitment to an ethical ideal rather than to historical inevitability" (Aronowitz, 2001, p. 7 in Cahill, 2009), I find myself in a conundrum. On the one hand, my adherence to the University's Institutional Review Board (IRB) codes of human subject panels, and prior promises of confidentiality and ethical commitments with each of my interviewees keep me from sharing any of the collected information. On the other hand, as rightly pointed out by Bishop Desmond Tutu (as cited in Cahill, 2007, p. 49) "If you are neutral in a situation of injustice, you have chosen the side of the oppressor."

I chose to remain neutral; however, to me, this has been an incredibly difficult decision, not only because I had to suppress my own opinion during fieldwork, but also because of the impact I could, but did not, have on this conflict. I believe that if done carefully, I could use the information I collected, along with the conflict management skills I learned while in graduate school to contribute to the de-escalation of this disagreement.[21] Until August 2011, which is when I left the field, the Parón conflict was frozen. Stakeholders were stuck in their positions and negotiations were suspended. According to Kriesberg and Dayton "Once a conflict has persisted or has become severe, the adversaries tend to become locked into the positions they have previously staked out… Mediators often help reframe the struggle" (2011, p. 9). In addition, Aall argues that "the power in mediation lies in part on the mediator's ability to be an agent of communication, to bring the parties information that they need" (2007). I am not suggesting that I could be a mediator to this conflict. Instead, my dilemma lies on the ability I have to de-escalate this conflict by communicating my knowledge to the different water user groups. As such, with my research experience, I have found myself "negotiating ethics" and learning about the contradictions between 'institutional ethics' and 'ethical practice' (Cahill et al., 2007).

In this light, I would like to point out my own biases to the reader. As I try to remain objective, I acknowledge that my arguments and the information I acquired while in the field are not neutral. As Rose (1997) argues, the knowledge made depends on who its makers are. As pointed out before, power relations between myself and my interviewees have affected the knowledge that I collected. In addition, my 'position and agency' (Katz, 1992) while conducting interviews was strongly influenced by my past experiences and personal opinions on the topics

[21] In his book, Tidwell argues "The manner in which you interpret the value of conflict will have a great impact on the way you study conflict but will also influence the way in which you may or may not seek to resolve it" (2001, p.36). For my research, I viewed conflict as intimately tied to justice. While disagreements normally emerge from an injustice, these serve to achieve social change, and result in either reinforcing or further undermining. However, I also recognize the importance that individual perceptions play in the emergence and transformation of a conflict. Hence, in my analysis, (1) I place emphasis on the different party's perceptions, interests, and positions; and (2) I implicitly assume that a mediator is able to de-escalate the conflict.

discussed.

I believe that the information I gathered from interviews is strongly shaped by who I am, how my interviewees perceived me, and the way in which I was introduced to them. Some research participants exerted authority. As a young female who is just beginning her career, I felt that on a few occasions public officials failed to take me as seriously as I would have liked. For instance, many times, during scheduled interviews, I was stood up, or after waiting for long periods of time, granted just a few minutes for a continuously interrupted interview. Also, on several occasions, I was promised information that I never received.

As some participants exerted authority, others were subservient. For example, I connected with personnel at PNH, private lawyers, and consultants in Lima through networks I established while living in Peru. As I understand, those that helped me connect with these interviewees, are powerful individuals that had a strong relationship with my interviewees. Hence, interviewees went out of their way to ensure I left the interview more than satisfied, connecting me with others and giving me more information than I would have acquired otherwise.

While I acknowledge that my identity shaped these advantages and inconveniences, I am aware that they could have been also affected by the 'circumstances' in which knowledge was produced (Rose, 1997). As such, I recognize that "The knowledges produced… are within the context of our intersubjectivities and the places we occupy at that moment (physically and spatially as well as socially, politically, and institutionally). Knowledge is always partial and representations of knowledges produced through field research embody power relations that the researcher must be aware of in undertaking ethical research." (Sultana, 2007, p. 382)

STRUCTURE OF THESIS

To answer my research question, I consider it appropriate to structure this thesis into five chapters. While I address the research questions more directly in the conflict and vulnerability chapters, I begin by situating this discussion in the historical, economic, and cultural settings of Peru, and particularly, of Ancash and Caráz. Thus, following this first introductory chapter, Chapter Two introduces the reader to the contextual setting for the subsequent analysis. In the first section, I illustrate the gravity of Peru's water stress problem. Most urban centers are located in the arid coastal region and rely on water flowing down from the Andes (Gonzales, J, 2011). In addition, the booming industries of agriculture for export and mining also require heavy volumes of water (Painter, 2007). Subsequently, I analyze the Peruvian water legislation. First, I situate the 2009 Water Resources Law historically. In this section, I show how, as a response to changing water demands and threats, the Peruvian Government drastically changed the national structure for water governance. Second, I provide a brief critical analysis of the design and current implementation of the law. Particularly, I emphasize the ways in which this legislation is failing to provide sustainable or equitable results. In the following section, narrowing down analysis to the regional and local scales, I review the social and environmental trends in the research area. I briefly assess the socioeconomic tendencies in Ancash, and provide a deeper analysis on trends of water demand vis-à-vis water supply. Particularly, I compare how local livelihoods, and water needs and management practices, compare to water supply tendencies. As de-glaciation is affecting water availability in the Cordillera Blanca in the central Andes (Vuille et al., 2008), this potential water scarcity and conflicting uses pose critical risks to those communities that depend heavily on water for their livelihoods (Young & Lipton, 2006). In brief, by introducing the country's water challenges and giving an overview of the local social

and natural landscapes, my aim is to situate the reader in the national and local context. But in addition, my intention with this chapter is to provide a peek at the landscape of vulnerability in the central Andes of Peru.

In Chapter Three I provide an overview of the Parón conflict. This disagreement unfolds in a context where access to water is shaped by governance arrangements, and where these arrangements are in turn shaped by changing institutions, laws, and politics that benefit some users at the expense of others. In PL most residents heavily rely on irrigation water for their livelihoods. The management of its headwaters, lake Parón - that provides the large majority of water resources for the watershed - is key to the wellbeing of downstream communities. For over sixteen years, ever since the lake's governance body moved to private hands, water users in Parón-Llullán have struggled to secure their access to water, and to protect their livelihoods (Lynch, 2012).

This struggle, though, does not only represent the contestation and negotiation over access to water. The Cordillera Blanca is a disaster-prone area, where the most prominent risks are induced by glacial lakes. In addition to water distribution, the management of lake Parón's waters is key for the mitigation of the risk of an outburst flood. Hence, with this conflict it is both access to water and vulnerability to disasters that are being negotiated. In the past few decades, as water governance arrangements changed, and today, as the establishment of new governance body is being negotiated, vulnerability has been and continues to be shaped and re-shaped.

Even though this chapter is mainly empirical, by mapping the conflict's progression, I point out the ways in which the transformation of and negotiation over water governance arrangements have affected and are affected by the changing social, economic, and political

landscapes. In the first section, I focus on the conflict's early stages, and explain how it emerged and developed. Since I consider the privatization of hydroelectric plant Cañón del Pato (and of lake Parón's infrastructure) to be a key moment in this conflict, this section is centered on the social, environmental, and political consequences of this transaction. In the second section, once again, I study the sociopolitical consequences of yet another transformation to lake Parón's water governance body. This time, however, since it was the disenfranchised who took power, PL was witness to a very different set of changes. While residents gained secure access to water, PL's political environment grew increasingly unstable, turning victory into uncertainty. In the third section, for a better understanding of the conflict, I provide a stakeholder analysis that uncovers positions, underlying interests and user group strengths and weaknesses. Bringing context for the subsequent section, which discusses the challenges to negotiations, this analysis brings to light the stark differences between stakeholders, and the ways in which they perceive each other. In the final section, I explore the negotiation process. Even though the key actors necessary to move the conflict forward are present, and the main topics of concern appear to be discussed, the stakeholder broken relations are proving to be a major deterrent to achieving any type of agreement.

I use the fourth chapter to explore the ways in which water governance and vulnerability are co-produced. However, rather than exploring vulnerability as a whole, I focus my analysis on the specific drivers that are directly related to lake Parón and the management of its waters. In the first section, I provide the theoretical foundation for the study. I introduce political ecology to then explain the analytical framework I use for my assessment. After a brief review of research on vulnerability and water governance theory (Adger, 2006; Bakker, 2003; Budds & Hinojosa, 2012; Cutter, 2006; McLaughlin & Dietz, 2008; Perreault, 2005; Ribot, 2009) I explain the ways

in which I conceptualize and use these terms in my analysis. In the second section, I analyze the relationship between water governance and vulnerability. For this, I borrow from Budds and Hinojosa's (2012) framework of analysis and recognize the relation between water governance and vulnerability in Parón as embodied in, and expressed by, a range of 'moments' or instances that I use to examine this relationship.

While I analyze Parón's landscape of vulnerability throughout the conflict, I place particular emphasis on the effects that the introduction of technology to the lake have had on PL residents' vulnerability. In my view, the construction of water infrastructure in Parón is a key moment because this technology, along with the possibility to manage the lake's waters, allow for vulnerability and water governance to be directly linked, and to have a two-way relationship. Ever since this relationship was established, the landscape of vulnerability has been altered significantly. In an environment driven by conflict, and characterized by its political instability, changes to vulnerability became more abrupt and unpredictable. As I show in this chapter, while PL's vulnerability continues to fluctuate with the changes in governance arrangements, the effect of discourses and perceptions of vulnerability on the determination of Parón's water governance becomes evident as stakeholders negotiate the lake's water management.

Finally, in the fifth chapter, the conclusion, I provide a short summary of my discussions and provide recommendations on ways in which the state can begin to think about dealing with this problem.

CHAPTER 2

REGIONAL CONTEXT: HISTORICAL, ECONOMIC, AND CULTURAL SETTINGS

This chapter serves to provide the reader with contextual knowledge of the environmental, historical, economic, and cultural settings in which the conflict unfolds. The first section introduces the reader to Peru's water challenges. After providing an overview of the major water issues threatening the country's economic and social stability, I explore the ways in which the government is dealing with them, and analyze the impact of these actions on water users from Andean communities, such as the ones studied. In the second section, changing the scale of analysis to the regional and local scales, I provide an overview of socioeconomic and environmental trends in the study region – Ancash department and Callejón de Huaylas.[22] I give particular attention to local livelihood practices, and water needs in the area. Finally, in the third section, I explore the local water supply vis-a-vis water demand. While climatic fluctuations are diminishing the quantity and reliability of usual water sources, economic, social and political policies continue to plan for a growth and expansion that will only increase water demand. Given the declining trend in water supply, I show the precarious situation of a growing number of users with opposing water demands, and the ways in which these competing needs further aggravate the local water pressure.

PERU'S GROWING WATER CHALLENGES

Peru is a country that faces serious social and environmental water issues. First, the spatial patterns and trends of water supply and demand in the country represent a serious challenge to sustain future development. While the majority of population and economic development are centered in the arid coast, most water resources are located in Amazonian Peru.

[22] The Callejón de Huaylas is the inter-Andean valley where the research area is located. For more information see the "Natural Landscapes" section in this chapter.

In this light, the Peruvian government is struggling to determine how to better allocate and govern the resource. Second, climate change and the consequential patterns of increasing glacial melt, impose an imminent threat of water scarcity. Today, most water use for coastal development originates from the Andean glaciers. With this water source dwindling, the country's economic stability and growth is put at risk. Furthermore, as explored in the following sections, in addition to affecting the economy, water cycle changes provoked by climate change increase the risk of natural disasters in areas such as Cordillera Blanca.

Geographies of Water Use: A Spatially Disparate Supply and Demand

With a population of almost thirty million people, Peru is the fourth most populous country in South America (US Department of State, 2011). Close to 30% of the total population currently lives in the metropolitan area of Lima/Callao (El Comercio, 2011c). Having such a strong political and socioeconomic centralization, Peru faces a series of challenges. In fact, during the last decade the government was re-structured in an attempt to de-centralize country. Among the several challenges of a centralized economy is the allocation of natural resources. In Peru's case the use and distribution of water is particularly difficult.

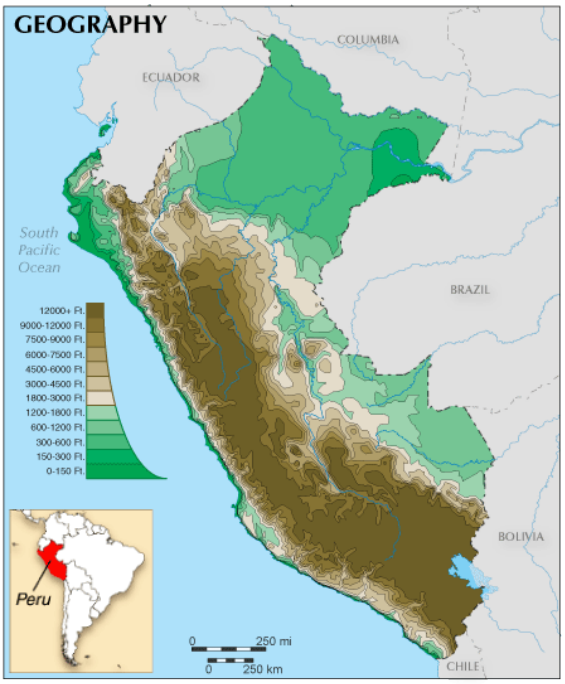

Figure 3: Peru's Topography. **Source:** http://www.gg.uwyo.edu

Seventy percent of the country's population inhabits the coastal desert, and since only two percent of the water supplies are found in this area (Trigoso Rubio, 2007), people mainly

rely on glaciers from the Andes, or *sierra*, for their water use.[23] In fact, there are many watersheds in the coast that are experiencing water scarcity already (see Figure 4). In addition, the booming industry of export-oriented agriculture, that is also located in the arid coast, requires large volumes of water (Painter, 2007).

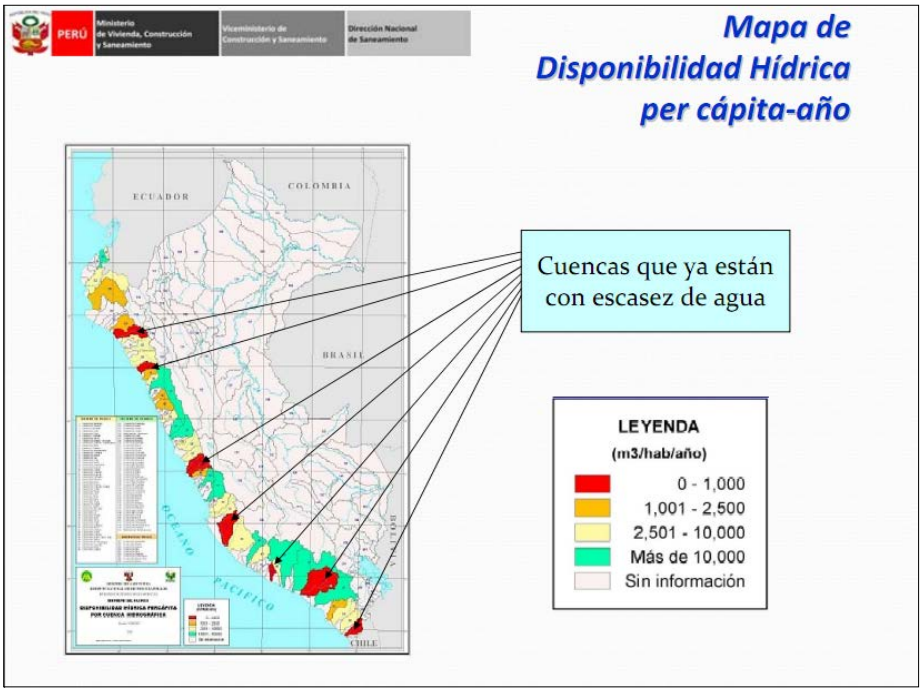

Figure 4: This map depicts the Peru's per capita water availability for one year. Note that, the emphasized watersheds, all on the desert coast, are those who already experience water scarcity.
Source: Ministry of the Environment (http://www.minam.gob.pe/foro/)

According to studies conducted by the Ministry of Energy and Mines, the major uses of fresh water in Peru are agriculture, mining, industrial and energetic; with agriculture (80%), domestic and industrial (18%) and mining (2%) being the most important uses in 2004 (Oficina General de Planificación Agraria, MINAG, 2008).

According to ANA, the country's demand for water is increasing mainly due to further development in the production sector, primarily in agriculture, which represented 80% of the total water use in 2010. Domestic use, particularly, is expected to grow as urban population continues to increase, and as the government begins to implement 'Agua para todos', an

[23] The coast covers approximately ten percent of the national territory. This narrow desert area is home to approximately two-thirds of the total population and contains the majority of economic development activities in Peru (BBC, 2011).The sierra is the area that encompasses the Andes mountains and that covers approximately thirty one percent of the national territory. This area, which ranges from 2,000 to 6,700 m.a.s.l (meters above sea level), stretches from the northern to southern ends of the country (Figure 3). Sierra temperatures vary according to altitude, ranging from valleys to freezing highlands and snow-covered peaks.

ambitious program that expects to increase access to water and sewage throughout the country.[24] As most economic activity takes place in the coastal desert, these increasing rates of water demand similarly originate in this area. To this day demand continues to grow; however, the prospects for economic growth and development in the country begin to weaken because the main water source for this area - glacial melt water – is beginning to decrease.[25] As water scarcity in coastal Peru becomes a growing threat, the government continues struggle to decipher ways to alleviate this trend. In fact, reports from ANA suggest exploring water transfer between watersheds, probably a multimillion dollar project that would engender conflicts very similar to the one studied in this thesis (Autoridad Nacional del Agua, 2009).

Given this scenario, it is likely that the struggle for water access will intensify throughout the country and that minority communities and small-farmers in the Andes will suffer most from it.[26] In addition to facing a future of water scarcity Peru's legal and institutional framework for water governance has drastically changed since 2009. Even though these changes promote decentralization, a cross-sectoral water use, and user-groups participation, to critics they appear to favor strong economic actors and reinforce inequitable access to the resource (Budds & Hinojosa, 2012; Lynch, 2010).

CLIMATE CHANGE AND WATER SCARCITY

Climate change is producing a plethora of issues at the environmental and socioeconomic levels, including fluctuations to temperature and precipitations, increased rate of glacial melt, water stress, damaged livelihoods, increased migration, and increased disease rates (Bury et al.,

[24] "Agua para todos" is a public program that was formulated in 2006 by then president Alan García. The program is being financed by public and private entities as well as the Inter-American Development Bank and it aims to improve quality of life and health of its beneficiaries by significantly expanding water supply and sewage systems. The five year program is targeting to increase access of 49,000 families to drinking water and 57,000 to sewage systems (IABD, 2007). Even though the program aimed to target disenfranchised populations, it has been criticized for benefiting Lima's resident's only.

[25] For more details see the climate change section on this chapter.

[26] These populations are particularly vulnerable because they heavily rely on water for their livelihoods. In addition, as I explain later in this chapter, it is likely that the newly implemented Water Resources Law will favor industrial water demands.

2011; Fraser, 2009; Trigoso Rubio, 2007). Scientists have ranked Peru as in the top twenty countries with higher risk to climate related disasters (Brooks & Adger, 2003). Even though all these issues pose serious threats to the population, glacial melt and the prospect of water scarcity are the impacts most often studied by experts and policy makers (Bradley et al., 2006; Llosa et al., 2009; Portocarrero et al., 2008). A potential decline of glacial water supply places the country in a critical situation, making it the most water stressed in South America (Bebbington & Williams, 2008).

Glacial recession in Peru is widely recorded (Bury et al., 2011; Bradley et al., 2009; Georges, 2004; Mark & Seltzer, 2005). The Andes region encompasses 95% of all tropical glaciers in the world; 71% of which are located in Peru (Llosa et al., 2009). The country has experienced a widespread loss of glaciers. In 1997 the Cordillera Blanca lost 16% of its total recorded area in 1970 (Llosa et al., 2009). In 2005, Broggi glacier, also within this range, disappeared. While there are many scholars who study the physical aspects of glacial recession, in the past few years, experts and policy makers have begun to investigate its social effects.

The study of social effects of glacial retreat is vital in Peru because of the potential threats it imposes on the country. In addition to representing a serious threat for its economic and social development, de-glaciation is increasing the prospect of water scarcity in the Andean and coastal regions of Peru (Young & Lipton, 2006). Populations in Andean Peru are particularly vulnerable because their livelihoods are heavily reliant on glacial water. Furthermore, glacial melt is exposing Andean cities and communities to natural hazards because new glacial lakes are forming in unstable places (Unidad de Glaciología y Recursos Hídricos, 2010). Inhabitants of towns and cities nearby the Cordillera Blanca are particularly vulnerable since this area encompasses the largest concentration of glaciers in the country (Chuquisengo & Ferradas,

2007).

A Shifting Water Governance Framework

As a response to these serious threats, the Peruvian government is exploring a series of different approaches, including increasing the reliance on technology and improving the governance system to better organize water allocation and reduce wasteful practices. In this section, I elaborate on the former water governance framework. I focus my analysis particularly on the recent changes to Peru's legal and institutional framework of water governance, and on its implications for populations such as those in PL.

Until 2009 the country's water resources were governed according to the 1969 *Ley General de Aguas* or General Water Law. This legislation, supporting the recently passed agrarian reform, took power away from private owners and for the first time in the country's history, framed water as a public good. This framework distributed the responsibility to control the resource among ministries, including the Ministry of Agriculture, Ministry of Health, Ministry of Energy and Mines, and Ministry of Housing. Of all these, the ministry of Agriculture had the most authority and power, after all, this legislation was designed to reinforce agricultural development, particularly on the coast of Peru (Oré, 2005). In the 1990s, the Fujimori administration restructured the general water law's legal framework to further incentivize economic investments on large scale agriculture, to expand international investments especially on mining, and to promote privatization of water treatment facilities (Oré et al., 2009).

In 2009, as a response to changes in the nature and structure of the Peruvian state,[27] to facilitate significantly different water use needs, and to respond to the increasingly important threat of water scarcity, the Peruvian legal structure for water governance was drastically

[27] In 2003, the Peruvian state began a process of decentralization (Ley de Bases de la Decentralización - Ley No 27783). To reinforce this effort, as opposed to the 1969 water legislation, the 2009 legislation, presents a decentralization component.

changed. First of all, the responsibility to manage the resource was transferred from the different ministries to a single government institution, ANA. The National Water Authority was created in 2008. This new cross-sectoral, autonomous, and decentralized organization was set out to have presence at the regional and local level. At the regional level, the organization plans to have 14 *Autoridad Administrativa del Agua* or Administrative Water Authorities (AAA), and at the local level, in each major river basin, the organization will be represented by ALA. These changes were intended to 'fill the gap in water governance that previously existed between the national level and the irrigation district' (Budds & Hinojosa, 2012, p. 127). However, since restructuring efforts began fairly recently, and ANA's presence in the regions is only beginning to appear, even though it is too soon to tell how successful these efforts will be, some of the processes that are being used raise a few red flags.

An important interest behind all these changes was to further promote the country's administrative decentralization. In 2003 the Peruvian government began a process of decentralization. Regional governments were created and given the responsibility to implement policies related to the provision of social services in their territory (Oré et al., 2009). With the 2009 Water Resources Law the responsibility to create and design of water related policies remained with the central government; however, the implementation and sustainable management of the resource were assigned to the regional governments. While this effort promises to improve representation and participation of disenfranchised populations, fieldwork indicates that on the ground, thus far, this is far from reality. The coordination needed for a proper decentralization process is obstructed because regional and local governments remain disconnected from wider political-economic processes (such as economic development and land use planning) (Budds & Hinojosa, 2012). In addition, the process used for de-centralizing water

management is raising concern among researchers. Oré et al. (2009) point to the danger of giving the central government authority to design water policies but assigning responsibility to the regions. Furthermore, fieldwork indicates that while regional and local actors are assigned tasks, they do not receive sufficient funds to get them done properly. For instance, in the case study area, this particular problem is further aggravating relations between the government and PL's residents. While Huaraz's ALA, as a part of the new law's implementation, had the obligation to formalize water rights all throughout the area, given the lack of financial resources and time, they failed to properly explain the legislation among others to water users in PL. As a result, PL irrigators interpreted these efforts as yet another governmental gimmick set up to take away their water rights. Hence, they refused to cooperate with the project (Field notes, 2011).

With this in mind, and as others have argued, there is little evidence that efforts to integrate voices and opinions at different levels of government, along with those of citizens, are reducing tensions between different users and interests (Budds & Hinojosa, 2012). Particularly, I am referring to the participatory aspect of the 2009 law, which intends to promote coordinated development and to bring about 'social and economic welfare in an equitable manner' (GWP-TAC, 2000). However, similar to other studies, fieldwork indicates that, rather than securing local water rights and resulting in equitable water distribution, participatory processes further ignite conflicts and distrust and potentially make disenfranchised users even more vulnerable (Arellano-Yanguas, 2011). I acknowledge that since my analysis derives from a conflictive environment, it will lead to a biased argument that should probably not be generalized to the country level. However, given the prospect of water scarcity in the country, a context such as the one in PL will probably become more common throughout the country.

The effects of climate change, especially de-glaciation and water scarcity, are very

influential on this new legal framework. Among other approaches for these challenges, is the promotion of a more 'efficient' use of water, which is believed to be achieved by increasing the use of technology and by treating water as an economic good.[28] In fact, regulations of the 2009 Water Resources Law mandate the establishment of 'parameters' for efficiency, the promotion of technology use,[29] and the management of water as an economic good.[30] Regulation article 102 even allows AAAs to remove water rights from users when if not paying for two consecutive times.

These approaches to water scarcity are quite problematic because they appear to further reinforce inequity. Treating water as an economic good will intensify competition over the resource, and end up allocating it in a way that will benefit those who are economically powerful, and who happen to have needs for higher quantities of water. With a prospect of increasing conflicts over water, this approach, if implemented as thus far it has been in Parón, will likely hinder, rather than promote, cooperation among water users.

PARÓN WATER CONFLICT: AN INTRODUCTION TO THE REGION'S SOCIAL AND NATURAL LANDSCAPES

NATURAL LANDSCAPES

The Parón conflict takes place in the central highlands of Peru, within one of the most resource abundant departments in the country, Ancash. The territory of Ancash Department expands through the geographic regions of the *costa* and *sierra* (Figure 1). The sierra in particular has a unique topography, which is characterized by the presence of two almost parallel

[28] This approach originates from the 1992 Dublin Principles, particularly from Principle 4 that recognizes water as 'a public good that has social and economic value in all its competing uses'. The Dublin Principles are expert water governance recommendations that had a significant influence on strategies presented to the 1992 World Summit in Rio. As a result, supranational actors such as the World Bank and Inter-American Development bank, who had an important role during the development of the 2009 Water Resources Law, promote these approaches (Comisión Técnica Multisectorial- Gobierno del Perú, 2003).
[29] D.S. 001-2010-AG, Article 31, 35, 40.
[30] D.S. 001-2010-AG, Article 102.

ranges on the western Andes: *Cordillera Blanca* or the white range, and *Cordillera Negra* or black range. The Cordillera Negra is smaller than the Cordillera Blanca and is located to the west of it. It is characterized by its various ridges, its steep, almost vertical, rocky slopes, and its relative dryness (since it has no glaciers). The Cordillera Blanca, by contrast, encompasses a series of snowcapped mountains that are the highest in Peru (MINCETUR, 2002), and is the highest tropical range in the world. Approximately half of its peaks are covered in snow and ice, which serve as an important source of water and attract vast numbers of tourists (Bradley et al., 2006). The Cordillera Blanca is home to PL watershed. The Parón water conflict unfolds in an area that extends from the glaciers of the Cordillera Blanca to the valley located between both mountain ranges, the *Callejón de Huaylas* (Figure 1).

The Cordillera Negra and Cordillera Blanca are separated by the Callejón de Huaylas, an inter-Andean valley in the Santa river valley that stretches for 150km from north to south and that ranges in altitude from 4,000 m.a.s.l, at its southern end, to 2,000 at its northern end (MINCETUR, 2002). This valley is home to arable lands thanks to the Santa river, which traverses the valley in its entirety and provides it with a constant flow of water. With a dry and temperate climate and a continuous flow of water, agriculture, especially at lower altitudes, is the most important livelihood source to its inhabitants. Table 1 shows the importance of agriculture in the provinces where the Santa River traverses, and especially in rural areas. The study area, which is within the province of Huaylas, is no different. While agriculture is the most popular economic activity, it is not the one that generates the most income. Scholars and policy makers associate reliance on agriculture with poverty (Trivelli, Escobal, & Revesz, 2009). Agricultural production in Ancash is allocated primarily for family consumption, followed by commercialization. Whereas coastal farming in Ancash is characterized by large agro-export

projects in large land holdings, the majority of *Ancashinos*[31] working on agriculture are smallholder farmers who live mostly in rugged highlands terrain (MINAG, 2011).

Table 1: Reliance on Agriculture on Provinces along the Santa River

Province	Total PEA*	PEA working on Agriculture	%
Huaráz	**52 131**	**10 213**	**20**
Rural	10 920	7 309	67
Carhuaz	**12 769**	**7 342**	**57**
Rural	7 569	5 559	73
Corongo	**2 497**	**1 308**	**52**
Rural	1 114	747	67
Huaylas	**15 872**	**8 690**	**55**
Rural	9 304	7 345	79
Recuay	**5 447**	**2 210**	**41**
Rural	2 224	1 350	61
Santa	**143 176**	**17 429**	**12**
Rural	9 002	7 144	79
Yungay	**16 430**	**10 743**	**65**
Rural	11 415	9 296	81

*PEA is the population in working age.

Source: INEI, 2007

The *Santa watershed* (Figure 6) is Peru's most extensive watershed draining to the Pacific Ocean (Pouyard, Yerren, & Zapata, 2005) and Ancash's chief source of water. Stretching for over 335 km, the *Santa River* originates in Lake Conococha, at an altitude of 4050 m.a.s.l. and drains into the Pacific Ocean after flowing through the hydroelectric plant in Huallanca and the Cañón del Pato gorge.

SOCIAL LANDSCAPES

Ancash's territory is a complex and heterogeneous space that extends through the Peruvian costa and sierra. In addition to being characterized for having a variety of natural landscapes, Ancash encompasses a plethora of socioeconomic characteristics. Since the conflict studied takes

[31] Term used to refer to a person from Ancash.

place in the Andean area, I will emphasize the social and environmental dynamics of the Ancashino Andes.

As a mainly rural area, Andean Ancash inhabitants have fewer sources of livelihood than in urban Peru. The most common activities include farming, herding, mining, and fishing (INEI, 2010a). Overall, the vast majority work on agriculture; however, this livelihood source is increasingly becoming unreliable. Given climatic fluctuations, small farmers are experiencing crop failure more and more often (Personal communication, ALA representative, June 8, 2010). Additionally, not only do these farmers hardly produce enough to survive, but because of market oriented policies in the agrarian sector and free trade agreements, they are also isolated from the national market economy (Trivelli, Shimisu, & Glave, 2003); thus, generally they experience widespread poverty. In the case of PL, many farmers expressed concern for their livelihoods, because these trends, in addition to the struggle for water, are forcing many to sell their lands to large agricultural companies and move elsewhere (for more detail see stakeholder analysis section of Chapter Three).

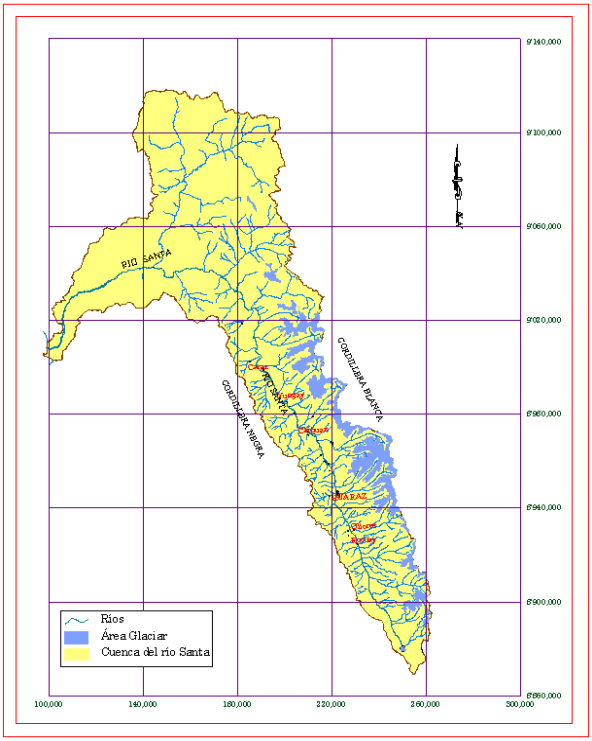

Figure 5: Cordillera Blanca Hydrology: Santa Watershed **Source:** Autoridad Nacional del Agua

Contrary to the reduction of poverty rates portrayed by census data at the departmental level (INEI, 2010b), the majority of districts in Andean Ancash remain in poverty or extreme poverty; a situation that is aggravated by the lack of infrastructure and limited access to social services. According to Forosalud's national coordinator, 30% of Ancashinos do not have access to any

type of health services due to the lack of infrastructure in the Andean area[32] (RPP, 2011a). In 2011, a study concluded that over 50% of the area's infant population suffers from either chronic malnutrition or anemia (RPP, 2011b). Similarly, limited access to education contributes to rural Ancashino poverty. While in 2007 92% of all rural children between six and eleven years old attended school, only 83% between the ages of twelve and sixteen did so (INEI, 2009a); suggesting that some children drop out of school to work. This is a quite serious problem because with a rural illiteracy rate of 26% Ancashinos are further limiting their opportunities to diversify their livelihood.

Similarly, limited access to other public services such as electricity, water, and sewage, contributes to rural poverty and social vulnerability.[33] According to the 2007 national census, on average over 50% of all households in Ancashino Andean districts do not have access to any type of sewage system (INEI, 2009a). Additionally, in this same area, an average 80% of households use primarily firewood for cooking, an energy source that, according to the scientific community, is linked to greater risks of respiratory diseases and mortality (Riojas Rodriguez et al., 2001). In addition to limiting people's livelihoods, the lack of social services renders Andean Ancashinos more vulnerable to disease.

In summation, factors such as insufficient infrastructure, limited access to public services, insecure livelihoods, and exclusion from benefits of development policies, demonstrate the degree of inequality in Peru. These factors clearly indicate that Andean Ancashinos have been continuous victims of the Peruvian social system. And with this system their status of second class citizens is reinforced and the social dynamics by which Andeans are made vulnerable elucidate.

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[32] Forosalud is a Peruvian civil society organization that promotes social justice in regards to health issues.

[33] Social vulnerability refers a person, organization, or society's lack of capacity to endure negative impacts from social interactions, institutions, and systems of cultural values (Oliver-Smith et al., 2012).

It is in such a divided social context that the Parón water conflict takes place. While the three PL communities involved in the conflict – Caráz, Campiña, and Cruz de Mayo – experience these dynamics of exclusion in different ways,[34] fieldwork results indicate that they all resent the government for its absence and acknowledge the ways in which the Peruvian social system segregates them. In addition to this picture of segregation against the rural Andes, an assessment of the water pressure under which this conflict takes place, will facilitate the reader's understanding of some of the reasons that ignited the conflict and that prevent it from moving forward.

INCREASING WATER PRESSURE: DIMINISHING SUPPLY AND INCREASING DEMAND

This section brings to light an increasingly common situation throughout Peru. One in which a growing demand for water will likely surpass its diminishing supply. In this case, to set up the context for Parón's conflict, I explore the water challenges already affecting the Santa river – of which Parón-Llullán is a tributary.

DIMINISHING SUPPLY

The Santa River is well known for having a constant flow of water throughout the year; a characteristic that allows for the successful development of activities such as agriculture and hydroelectric generation In fact, the Santa watershed is home to the largest hydropower centers in the country, and allows for the development of massive irrigation projects such as *Chavimochic* and *Chinecas* (Figure 6).[35]All of this is made possible only because the Santa,

[34] These communities experience segregation and are socially vulnerable in different ways, which are mainly shaped by their livelihoods, location, and history. Since Cruz de Mayo is an indigenous community which is located in a segregated area, they experience vulnerability in a way that differs significantly from Caráz and Campiña. For more information see stakeholder analysis section of Chapter Three.

[35]Chavimochic is an irrigation project located to the north of Ancash, at the coast of La Libertad department. This multi-million dollar project aims to guarantee access to water to 144,386 Ha in the dry coastal valley of La Libertad. This project relies solely on waters from the Santa River, complicating the water governance challenges in the Santa Watershed. Chinecas is a hydro-energetic project located in the arid coast of Ancash. It is managed by the regional government of Ancash. This project encompasses the management of water for agricultural, energetic, industrial, and domestic uses. This project also adds to the sets of demands to be met by the Santa waters.

unlike other rivers in the country, is fed by perennial glacial melt and multiannual rainfall. Among the many glacial lakes that feed into the Santa river is lake Parón. However, while its water flows constantly, this flow does not remain constant throughout the year. It discharges 80% of its annual volume during the four months of rainy season, and only 20% during the eight months of dry season (MINEM, 2006). The uniqueness of this river, along with the benefits of its constant flow brings, are less secure than it would originally seem. Relatively recent variations in weather patterns have catalyzed the melting of glaciers and increased the precipitation variability. In doing so, these fluctuating climatic patterns have made the reduction of water flow imminent, and thus have placed at risk the fulfillment of current competing water demands in the watershed.

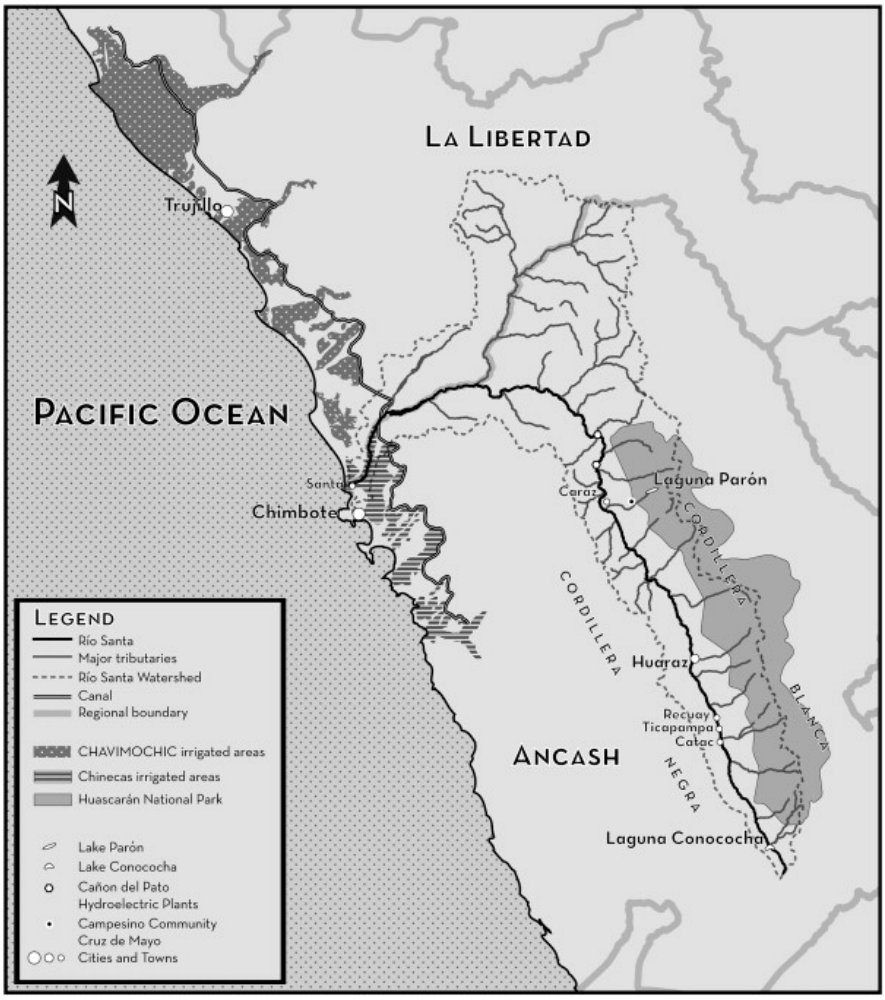

Figure 6: Santa watershed water uses**. Source:** Lynch, 2012

a. Glacial Melt

The Cordillera Blanca is one of the most researched glacier regions in the world (Mark et al.,

2010). Hydrologic studies of the Santa river watershed expose the significance of glacier melt to water supply in the basin under current conditions (Condom et al., 2011). This water source has become a particularly important water source because the rate of glacial melt has increased significantly since the 1970s (PNUD, 2007). In the upper watershed, melting glacier ice contributes annually with at least 10% of the total water, and potentially as much as 20% (Mark and Seltzer, 2005). Water contribution from lower watershed glaciers, including Artesoncocha, Parón and Llanganuco, is more significant (see Figure 7). Overall, the Cordillera Blanca supplies the Santa river with up to 40% of its water year round, and up to 66% during the dry season (Mark, 2008). Paradoxically, while glacial melt water helps secure Callejón de Huaylas residents and Santa river water users' livelihoods – including those in PL – it also makes them vulnerable to water stress. The more the glaciers melt today, the less water they will have from glaciers in the future.

Glaciers in the Cordillera Blanca are rapidly diminishing (Bradley et al., 2006; Mark, 2008; Vuille et al., 2008). Deglaciation rates vary within the ranges, being the higher altitude basins slower at melting than those at lower altitudes (Pouyard et al., 2005). Whereas in the 1930's ice coverage was estimated to range from 800- 850 km^2, in the 1990s it was measured as only 620 km^2 (Georges, 2004). Glacial retreat is so critical, that even some researchers have argued that the Santa river has already passed peak water (Morello, 2011).

b. Precipitation

The usual rainfall pattern at the Cordillera Blanca area is characterized by the presence of two well defined seasons: (1) the dry season, from May to September, when precipitation is almost absent, and (2) the wet season, from October to April, with peak times during February and March (Figure 8). In Huaráz, the capital city of Ancash located at the heart of the Callejón de

Huaylas, receives almost 60% of its total rainfall from December to March, and only 0.2% from June to August (Lavado et al., 2005). However, this pattern is beginning to change. As mentioned before, the effects of climate change are causing this cyclical pattern to fluctuate (Ministerio de Economía y Finanzas, 2008).

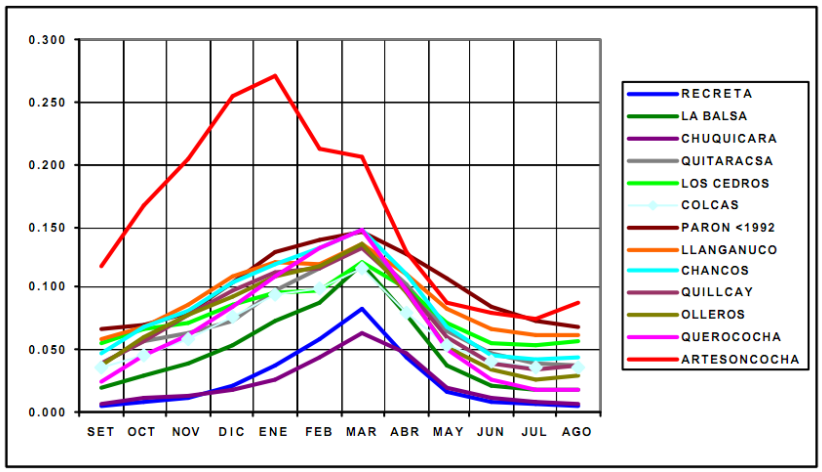

Figure 7: Average monthly runoff in the Santa Watershed.
Source:http://www.senamhi.gob.pe/pdf/estudios/paper_RRHHSANTA.pdf

Rainfall fluctuation presents serious obstacles for the region's economic development. First, since much of the highland farming is rain-fed, it makes the poorest populations (including those in PL) even more vulnerable (Bury et al., 2011). According to local small-farmers in PL, unpredictable weather continuously diminishes their yields by introducing new crop pests they are not prepared to eradicate, and by leading to highly unreliable irrigation (Field notes, 2010). Second, given that in the future, Santa water flows will mainly rely on rainfall, multiple downstream water needs will have to adjust to a diminishing, and unreliable, water supply.

Currently, there is a deficit of water during the Santa river's dry season. The quantity of water demanded is higher than what the river can supply (Portocarrero, 1992). Researchers forecasts that "as the glaciers disappear the river will depend on annual precipitation, and its dry

season volume will be less than combined domestic, agricultural, and hydroelectric demand — demand that is rapidly expanding with urbanization and construction of vast coastal irrigation schemes for export agriculture" (Lynch, 2010). Thus, increasing water demand will only aggravate this precarious situation.

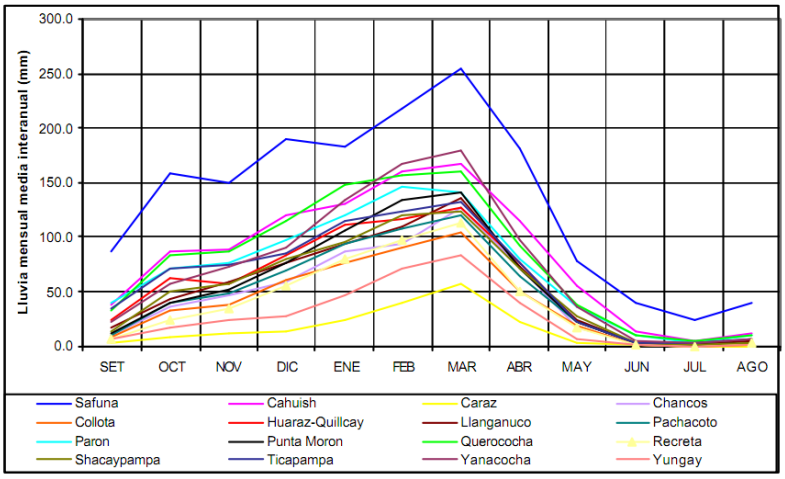

Figure 8: Average monthly multiannual precipitation in the weather stations of the Santa Watershed **Source**: http://www.senamhi.gob.pe/pdf/estudios/paper_RRHHSANTA.pdf

INCREASING DEMAND

The Santa river and its tributaries are a critical source of water for urban and agricultural needs of approximately one million people living in the upper portion of the Santa river watershed (Condom et al., 2011). Downstream from the highland urban areas, the Santa river flows through the steep Cañón del Pato, where the water is used for hydropower generation, and then reaches the coastal plain, to provide for urban needs and the two growing irrigation projects of Chavimochic and Chinecas (Figure 6).

In this section, although I acknowledge the existence of various important water needs downstream, given the location of my study area, I will limit my analysis to highland water demand. Table 2 shows the main economic activities driving water use in the area.

Table 2: Economic activities driving water use along highland Santa River

Population Center (see Figure 1)	Elevation	Distance from headwaters (km)	Water uses
Conococha	4,050 m 13,162 ft	headwaters	livestock, fishing, tourism-- Huascarán National Park.
Recuay	3,400 m 11,050 ft	62	livestock, mining, agroforestry, high altitude agriculture (potato, oca, tarwi, barley, quinoa)
Huaráz	3,090 m 10,042 ft	88	gold mining; urban development; tourism; high altitude agriculture, livestock
Carhuaz	2,650 m 8612 ft	126	corn, potato, bean cultivation, small-scale lime and coal mines, urban
Yungay	2500 m 8125 ft	153 km	corn, potato, bean, fruit cultivation; livestock, urban
Caráz	2290 m 7442 ft	163 km	agribusiness citrus, cut flower production, food production; gold mining tourism
Huallanca	1820 m 5,915 ft	205 km	hydroelectric plant; arid– little or no agriculture

Source: Lynch and Galewski, 2010.

a. Tourism

Huascarán National Park, the main tourist attraction in the area, has received an increasing number of visitors in the past few years. Whereas in 1987 it received almost 70,000 visitors, in the year 2000 it received almost 110,000 people and in 2011 over 125,000 visitors (INRENA, 2003; UNEP, 2011). Park officials expect this trend to continue. In addition, they are beginning to work more closely with nearby communities to create new sources of livelihood. While increasing tourism brings development to the area, it also puts more pressure on water resources. The more tourists this area receives, the more demands for water it will have. Scholars studying the effects of tourism on local communities have warned about changes in local water use patterns. For example, in the past, hotels have redirected the use of fresh water, leaving barely enough for local small farmers (Mandan and Rawat, 2000). Furthermore, being that it is

precisely the glaciers that attract tourists in this area, local livelihoods can be rendered vulnerable if communities become heavily reliant on tourism. For example the community of Catac, a few miles south of Caráz, suffered heavy economic losses when tourists stopped passing through their town because nearby glacier Pastoruri nearly disappeared. While the prospect of heavy reliance on tourism represents a risk for local livelihoods, the current dependence on agriculture is also becoming making livelihoods vulnerable.

b. Agriculture

As previously mentioned, agriculture is the most common livelihood source in the Callejón de Huaylas area, with potato, maize, and bean being the predominant crops in the upper valley and flowers, fruit, and artichokes in the lower valley (see Table 2; Field notes, 2011). In addition, this area is home to different types of agricultural practices: subsistence, domestic market-oriented, and export-oriented. Overall, these agricultural types segregate according to elevation in the catchment, with subsistence in the upper catchment, domestic commercial production in the middle area (in Callejón de Huaylas), and export-oriented commercial production in the lower catchment, near the coast.

The large majority of farmers in Callejón de Huaylas are engaged in small and medium scale work. Current numbers show that 70% of these have farms smaller than one hectare (Foro Agua Santa, 2011). Even though this area does not have a significant presence of large scale agriculture, this practice continues to grow and contributes largely to the water stress situation. Researchers report that since the late 1990's large scale agricultural production activities have been shifting towards water intensive, irrigated, high-value crop production in the Callejón de Huaylas (INEI, 2007; Painter, 2007 in Bury et al., 2011)

The water situation in this area is so critical that 60% of water commissions are no longer

accepting new users[36] (Foro Agua Santa, 2011). This situation elucidates the need for adaptation to environmental change and capacity building (Bury et al., 2011). Water users and public officials constantly refer to the need to preserve water in the face of future scarcity. However, on the ground, day to day practices, continue to be as wasteful as usual (Field notes, 2010). In the study area, public servants blame these wasteful practices on the farmer's 'lack of knowledge' and organization. Conversely, local small and medium farmers point to the need to improve the available infrastructure and the government's unwillingness to help (Field notes, 2011).

c. Hydropower

Peru is a country that is experiencing fast economic growth; consequently, its demand for energy is rapidly increasing. Projected demand growth rates will require supply to duplicate every seven to ten years (El Comercio, 2011a). From the year 2000 to 2007 electric demand increased by 49% (Barco et al., 2008). Its supply increased only by 25%. In the past few years, northern Peru has been facing energetic insecurity mainly caused by droughts (Barco et al., 2008). In the later months of 2011, this area experienced electricity deficit and officials nearly began importing electricity from Ecuador (El Comercio, 2011b). Even though the problem was solved by rationing energy, the risk of electricity power cuts in this area is still present.

The country's electricity supply is highly dependent on hydroelectric energy. According to 2007 Figures, 54% of the country's energetic supply was provided by hydropower (Barco et al., 2008). Peru's hydroelectric industry is connected through a network that consists of three different groups: generating, transmitting, and distributing organizations (Figure 9). This network allows for deficits in some areas to be covered by supply elsewhere. Thus, in the case of Callejón de Huaylas, electricity generation of local plants does not solely supply the local

[36] Because of the lack of access to land and water for agriculture, many young people are emigrating from the area (Foro Agua Santa, 2011).

demand.

The Santa River is home to four hydroelectric plants between the Cordillera Blanca and the coast, these generate a substantial amount of electricity (Mark, 2008). Of particular interest to this study is The Callejón de Huaylas' hydroelectric plant Cañón del Pato. This hydropower plant is operated by Duke Energy and its subsidiary Egenor. Given the uneven flow of water in the Santa River, constant electricity generation at this particular site is made possible by the use of three glacial lakes as reservoirs. In addition, with the possibility of extreme flow variations in the future, in 2001 Egenor built the San Diego reservoir along the river; however, even with these additions, Duke Energy is facing problems due to water shortage. During interviews representatives expressed concern about the plant's future. In 2010 the company experienced a financial deficit because of the limited water availability (Field notes, 2011).

d. Urban

In 2007, domestic water use represented 7% of the total Santa water usage (Vergara, 2007). The large majority of households that rely on Santa waters are located on the coastal area, particularly in the cities of Trujillo (the third most populous city in the country) and Chimbote (Rojas & Pagador, 2000). This coastal area is characterized by its high urbanization rates, which are mainly driven by rural to urban migration (SENAHMI, 2009). The consequential population growth rate in the area is further increasing the water pressure along with the vulnerability of the families which depend on Santa waters for their domestic use.

According to the latest Peruvian census, in 2007 there were almost 170,000 inhabitants in the major urban centers of Callejón de Huaylas.[37] Additionally, 18,000 people received water

[37] This includes the city of Huaráz (114,242), and the towns of Recuay (5,501), Orellos (3,665), Carhuaz (12,905), Yungay (20,149) and Caráz (25,204) .

licenses for domestic use in 2010. Even though domestic use does not represent a large portion of the overall water demand in the area, both primary and domestic[38] uses are the ones of foremost importance according to Peruvian law.

Figure 9: National Interconnected Electric System (SEIN). SEIN serves 85% of the population. In 2010 Hydroelectric generation represented 58% and Thermal was 42%. **Source:** COES (Comité de Operación Económica del Sistema Interconectado Nacional).

[38] Primary use encompasses all direct uses of water sources for primary needs that do not aim for profit making including cooking, drinking, personal hygiene, and religious and cultural ceremonies (Law 29338, Article 35).Domestic use refers to practices similar to primary use but where water that originates from a source that has been treated (Law 29338, Article 39).

e. Mining

The department of Ancash is the fifth largest economy in the country (INEI, 2010a). The region's economic importance is driven by the mining sector, which represents 15.9% its gross value added[39] (INEI, 2010a). This appears to be the most economically prosperous sector in the region. The Ministry of Energy and Mines estimates immediate future investments on mining, for exploration and expansion, to add up to more than US$1.8 billion (MINEM, 2011). However, even though this industry generates the most money in Ancash, Ancashino poverty rates remain high. As previously mentioned, this industry is not a major employer of local labor. In 2006 it employed less than one percent of Ancashinos (INEI, 2006).

Mining is one of the primary economic activities in the Callejón de Huaylas. Mine operations range from small scale artisanal to mines owned by transnational companies. Regardless of the scale of operation, mining practices are usually the cause of water-related conflicts in the area. These normally originate by unattended concerns over water quality (Huaráz Noticias, 2011). According to critics, mining operations generally contaminate water through acid drainage, illegal dumping, and mine tailings (Galewski, 2010). In addition, scholars claim that it also uses vast amounts of water (Painter, 2007). Even though, technological advance is increasingly improving the sector's water use,[40] it greatly adds to the pressure on water resources faced by users in this area.

CONCLUSION

In this chapter, I have tried to provide readers with sufficient context to understand the water conflict of Parón. But in addition to introducing Peru's water conundrum, my intention was to,

[39] Value of goods and services produced in the area.
[40] Representatives in the mining industry claim to recycle a large proportion of the water they use for their operations (Lynch, 2010).

indirectly, provide a peek at the landscape of vulnerability in the central Andes of Peru. For this, I have told the story of water stress in Peru. First, I introduced emerging water challenges in Peru - such as climate change and the geographies of water use – to then elaborate on the government's response to these threats, a new legal and institutional framework for water governance. Having in mind populations such as those in PL, I analyzed the implications of these changes. Furthermore, since my intention with this chapter is to facilitate understanding of the conflict, I used the subsequent section to introduce the social and environmental landscape in which this conflict takes place. With this, I hope to provide context for the subsequent chapter where I closely analyze the Parón water conflict.

CHAPTER 3

CONFLICT OVER ACCESS TO AND USE OF WATER IN PARÓN

INTRODUCTION

Environmental conflicts are those that originate over unequal use of and access to natural resources. Critical scholars associate a rising trend of such disagreements to the emergence of neoliberalized development policies in Peru (Arellano-Yaguas, 2011; Bebbington & Bebbington, 2011; Renique, 2009). These policies that introduced free trade and advocate a diminished the role for the government, have changed the management of the land and resources including water, forests, agricultural lands, and fisheries (Liverman & Vilas, 2006). Many of those who opposed to this trend are not against the extraction of resources per-se, but rather they protest how the expansion of the extractive industry is occurring. Their primary concerns are about problems of rights, transparency, citizenship, and environmental governance (Bebbington, 2009). According to Defensoría del Pueblo, in February 2012 environmental conflicts represented 58% of all conflicts in Peru (2012).

This thesis addresses one such conflicts, a conflict over access to and use of water resources in the Andean department of Ancash. This ongoing disagreement has evolved over the course of sixteen years. It emerged with local discontent with Parón's water management transition to the private sector, and it shifted significantly with the seizing of the lake by local water users in 2008. In this chapter, I will introduce and explore the Parón conflict. I will also point out the different ways in which conflict negotiations have been affecting people's vulnerability. While I tell the story of how the conflict began and evolved, I reflect on the ways in which multi-scalar political, social, and economic factors have contributed to the conflict's escalation until reaching stalemate. In the first section, I explain how the conflict emerged and developed. When, in 1996,

the government privatized the nearby hydroelectric plant Cañón del Pato, and offered lake Parón as part of the transaction, water governance in the Parón -Llullán watershed drastically changed. The lake was now entirely controlled by the hydroelectric company. Downstream irrigators and residents found themselves struggling to have reliable access to water. After repeatedly complaining to the government and not receiving a proper response, local leaders decided to fight for their water rights and seize control of the lake.

In the second section of this chapter, I examine the ways in which the community has been affected by the conflict. Community members in PL, as residents of the rural Andes, have long been marginalized by the larger Peruvian society. Voicing their discontent and making themselves heard has proven valuable in fostering cohesion amongst different local water user groups. The third section analyses each of the main stakeholders. This analysis introduces the main actors and their interests, analyses their role in shaping the conflict negotiations, and assesses their strengths and weaknesses for the negotiation. Cruz de Mayo, the indigenous community located in the upper PL watershed, has been severely affected by this conflict because most of the *comuneros* (community members) practice subsistence farming. Their main interest in the negotiation is to protect their livelihood. Campiña is also in the negotiation to protect their residents' livelihoods, as most residents practice small-scale commercial farming. Campiña residents live in lower PL watershed and have better access to alternate livelihood activities than Cruz de Mayo comuneros do. The Municipal Government has been leaded by the same official for two terms now. The conflict has served the mayor as a tool to gain political power. From day one, his position in the negotiation has been to advocate for the community. The National Water Authority, conversely, advocates against the management of the lake entirely by locals. As the government institution responsible for the regulation of water use and

distribution in the country, hopes to resolve the conflict with the implementation of the 2009 Water Resources Law. This institution has been facilitating and advocating a participatory process where stakeholders negotiate and plan the lake's water management. Their main interest in the negotiation is to avoid responsibility for the lake's infrastructure management and maintenance by re-introducing Duke Energy to the lake. The Local Water Administration, ANA's representative at the local level, is perceived by locals as responsible for the water mismanagement that engendered the conflict. Most local residents and water user group representatives dismiss ALA representatives as corrupt and inefficient. ALA officials maintain close relations with their counterparts at the national level and adhere to their position in the conflict. Unlike the Water authority, Glaciología has earned the trust of the community and is able to communicate with them. This institution is in the negotiation to ensure the safe management of Parón's water. Duke Energy, as the hydroelectric company that originated the conflict, has poor relations with the community and precarious relations with the government. The company has been ousted from the negotiations but hopes to re-gain access to the lake's water in the future.

The stakeholder analysis section serves as a precursor to the final section in which I explore the negotiation process. I discuss in detail the main topics negotiated, and examine the reasons for the outcomes we see today.

WATER CONFLICT IN PARÓN

HISTORY/CONTEXT

In the late 1960s, scientists began a series of investigations at the glacial lakes of the Cordillera Blanca to determine the latent risk and vulnerability in the area[41] (Defensoría del

[41] It was actually earlier when Parón began being investigated by experts. Lake Parón came into the spotlight, and was studied by

Pueblo, 2008). As a part of this effort, Lake Parón was surveyed and classified as an unstable moraine-walled lake. While it was continuously fed by glacial melt water, it lacked proper natural water release mechanisms.[42] These findings made evident that nearby populations were vulnerable to a natural hazard. Thus, to mitigate this latent hazard, in 1968 the government embarked on a project to lower the lake's water level (Carey et al., 2012). The completion of the disaster prevention project was delayed until 1985 by technical and financial difficulties. Since then, Parón's excess water release has been controlled, mitigating the risk of GLOF of nearby residents while at the same time providing an opportunity for an organized, and more 'productive', use of this resource.

In the early 1990s, the Peruvian government was led by Alberto Fujimori. At the time, as a result of economic collapse and civil war, Peru was recovering from political, social, and economic instability. Hoping to improve these conditions, Fujimori forged a strong neoliberal economic program which included structural reforms that aimed to attract foreign investment through privatization and pro-business economic policies[43] (Mauceri, 1995). The hydroelectric sector experienced these particular changes in 1992 (Electroperu, 2002). During this year, Electroperu installed floodgates on Parón 's drainage tunnel and 'turned the lake into a reservoir' (Carey et al., 2012, p. 185). Only two years later, in 1994, Lake Parón's waters were licensed to Electroperu for energy development;[44] however, after the company's privatization in 1996, the

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scientists for the first time in the 1940s, after a GLOF killed thousands in Huaráz (Carey et al., 2012). But it wasn't until 1951 that engineers began worrying about its instability (Fernandez Concha, 1957).

[42] The Lake is surrounded by five glaciers which, given increasing glacial melt rates, can potentially cause the lake to grow exponentially (Figure 12). However, unlike other glacial lakes in the area, Parón does not release water by overflow, instead, it only lets water out by infiltration through the moraine, which caused it to be unstable (Personal communication, engineer and former employee of Duke Energy June 10, 2010).

[43] It is through Legislative Decree N° 674, Law of Promotion of Private Investments in Government Organizations, that in September 1991, a process of governmental restructuration in the productive industry begins (Electroperu, 2002).

[44] License No 026-94-RCH/DR.AG.DRG/AT.

water license was transferred to Egenor, now a subsidiary of Duke Energy.[45]

The government made a very attractive offer when placing the Cañón del Pato - the hydroelectric plant operated by Egenor - on the market. First, the Santa River feeds the plant with a continuous flow throughout the year. Second, to compensate for seasonal variation in flow and to meet peak demand in urban centers, the plant was provided water from glacial lakes, including Parón (ICSID, 2008). Lake Parón was a highly advantageous addition to Cañón del Pato because by having control of the drainage tunnel operators would be able to release water according to their own needs. This particular advantage would secure the company's ability to generate electricity during the dry season, and save water supplies when electricity demand is low. Parón would allow for a more efficient and 'sustainable' use of water. It would also increase the reliability of supply for a growing hydroelectric industry. However, although this transaction allowed the government to succeed in securing a potential expansion for hydroelectric generation, it failed to accurately assess environmental and social impact at the local level.

The privatization of Cañón del Pato, especially the resulting local water management regime, has been very controversial to local and regional actors for several reasons. First of all, the decision to privatize the lake, which is located entirely within Huascarán National Park (Figure 1), puts in question officials' judgment and the government's credibility. Locals frequently refer to this event raising environmental justice questions such as: What did this imply for downstream populations that solely rely on this water for their livelihoods? Second, the license required Egenor to consult the local water administration before changing the lake's discharge flows. However, communications and decisions regarding the lake's use and management completely ignored the needs of local community members and farmers. Thus, while the one and only local

[45] In 1996, Dominon Energy acquired 60% of Egenor. In 1999 Duke Energy purchased 90% of Dominon Energy and between 2001 and 2005 an additional 10% was bought. Currently, Duke energy owns 99.9% of Egenor (Duke Energy, 2010).

water supply system was scheduled to drastically change, the community's voice was silenced by the newly imposed water governance structure. Finally, since the water authority failed to be transparent about the process of providing the company with a water license and about its enforcement, stories about how water was managed under private hands and its effects on the local environment began to spread across the community and generating animosity against public servants. Community members, backed by local leaders and technical experts in the area - including a former worker of Egenor - argue that the local water administration gave a license to release water at a rate that surpassed maximum rates recommended by experts.[46] In addition, they argue that once the license was given, the local water administration failed to oversee the lake's water management. As this was the case, Egenor failed to abide by the license, releasing water at a flow that surpassed the maximum allowed by the license by a factor of two[47] (Personal communication, irrigator and community leader, June 16, 2010). From 1996 until 2008, local water users and Duke Energy engaged in a series of discussions over adequate water release quotas. However, even though some changes were implemented as a result of continuous complaints,[48] fieldwork indicates that locals feel that despite their efforts their claims have been largely ignored by the authorities.

[46] According to local experts and Duke Energy technicians, the local water administration gave a license of 5.5 m^3/s. Local experts claim that this license failed to follow the recommendations made at the time the drainage tunnel was built, which suggested a flow no greater than 4.0 m^3/s for the conservation of downstream biodiversity (Personal communication, engineer and former employee of Duke Energy, 12 June, 2010).

[47] Local technical experts argue that flows were as high as 8m^3/s.

[48] In 1994 Administrative resolution n° 026-94-RCH/DR.AG-DRH/AT provides Electroperu with a license to release up to 8m^3/s from Lake Parón. In 1996, after the privatization of Electroperu, resolution Nº 025-96-RCH/DR.AGDRH/AT approves the concession's transfer from Electroperu to Egenor, continuing to allow for a water release of up to 8m^3/s. Additionally, mandating that Egenor conducts an environmental impact study for Lake Parón. In 2006, after continuous complaints from local water users, Administrative Resolution N° 044-2006/AG.DR-Ancash/Drs./AT authorizes Duke Energy to release up to 5.5m^3/s. In 2007, after Caráz's major, in representation of the local water users coalition, requested the Autonomous Authority of the Santa Watershed (contemporary maximum authority in charge of the watershed's development governance) to suspend Duke's license. As a consequence, notification Nº 0257-2007- DR.AG.Ancash/Drs./AT limits Duke Energy's maximum release to only 2.63m^3/s (Untiveros, 2010). To this, local water administration from downstream CHAVIMOCHIC complained given the impact to the agricultural production in that area, and Duke appealed to the specialized civil court in Lima, being able to achieve the cancelation of the previous notification. In 2008, the lake was occupied by force by local water users (Defensoría del Pueblo, 2009a). To this day, they manage the lake water releases.

Throughout the years, the use of Parón waters for electricity generation has been challenging for downstream user groups. Water needs of farmers and domestic users are almost opposite to those of the hydroelectric company. Both the quantity and timing at which water is needed have proven to be the major causes for disagreement. Whereas Egenor, in order to meet peak electricity demand in the urban centers, uses most water late in the evening, farmers, following the traditional work and irrigation schedule, use it throughout the day. The particular timing in which each farmer uses water depends on their location. Those who are further away from the water stream usually irrigate later in the day. With Duke controlling the water, irrigators found themselves having insufficient water for most of the day and too much of it for a few hours in the evening. With such a flow pattern, it was virtually impossible for all farmers to access enough water. Additionally, Duke's water management pattern that responds to needs that require substantial amounts of water for only a few hours, has proven harmful to local farmers and domestic users. It has damaged Caráz's water treatment facility of EPS Chavin (Untiveros, 2010), reduced the drinking water supply for the town of Caráz (Personal communication, irrigator and community leader, June 3, 2010), and damaged irrigation canals and crop production of downstream farmers (Peralta, 2010). As an interviewee explained "while sometimes they [Egenor] released too much water causing erosion, ruining the irrigation canals, flooding the fields, and damaging the quality of drinking water, other times they refused to discharge any water for days at a time ruining most crops" (Personal communication, irrigator and community leader, June 16, 2010).

The privatization of this hydroelectric plant is only one of many cases in which the government, in its pursuit of macroeconomic development, has sacrificed social equity.[49] This

[49] I emphasize "macro-economy" because by targeting the improvement of country-wide indicators, the government has been successful at increasing foreign investment; however, this economic growth is translated as unequal development throughout the

case perfectly exemplifies how larger governance systems, in their aim for efficiency, unevenly distribute costs and benefits of development. Citizens in the rural Andes often bear the costs for benefits to be enjoyed in the urban coast, without having a say in the matter. In this specific case, throughout almost ten years, locals have been institutionally silenced by not having a role in their water governance. In addition, since 1996, their access to water has been continuously sacrificed to secure a reliable supply for an increasing electricity demand in the country. The use of Parón's water for electricity generation has caused a severe strain on the surrounding communities. Since most households survive only from farming, Egenor's water regime has rendered their livelihoods vulnerable.

In addition, this privatization has had severe impacts on the quality of relations among local irrigators and on those between PL residents and the government. The imposed water governance arrangements had serious implications on the relationships between and among stakeholder groups. First of all, the local bonds of trust and reciprocity that inhere in social relations were critically harmed. Having access to less than optimal amounts of water, local irrigators began arguing over each other's water use and distrusting their neighbors. Secondly, the lack of transparency and accountability from the government's part only aggravated their image in PL watershed. Locals perceived the government's agreements with Egenor as disregarding their livelihoods. Thus, rather than being seen as a support, the government was perceived as an enemy that placed their livelihoods at risk. Finally, relations between the community and the hydroelectric company deteriorated sharply. Throughout this time, even though there were no direct confrontations between the community and the company, the conflict was escalating under the surface, sides were forming and positions were becoming rigid, and the more time passed, the

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country.

stronger the community's resentment toward Egenor grew.

In this context PL water users have found themselves in a conflict that has grown to be far more convoluted than they were prepared for. In July 2008, as irrigators from the campesino community Cruz de Mayo, and from Caráz lost their patience with unattended claims to the government, they blocked access to the lake and re-claimed it as theirs (Defensoría del Pueblo, 2009a). For almost three years access to the lake has been blocked. While Egenor representatives are strictly forbidden from coming to the area, public officials' entrance is closely monitored. Throughout this time, the conflict evolved from being a local discussion on water use and access, to a multifaceted regional and national disagreement that elucidated equity concerns in Peruvian water governance, and that began questioning the previously unproblematized link between water management practices and the risk of natural hazards in the area.[50]

Repercussions of The Lake's Seizing

Drawing from interviews, newspaper articles and video clips, it appears that once local leaders had control of the lake, the community became more cohesive and prouder of their identity than ever. "Residents were now conscious of the situation, it was as if only then, everyone [in the community] realized that they too have a right to secure water access and should have a voice in their water governance" (Personal communication, social scientist, June 24, 2010). While initially the event generated cohesion amongst local residents, this passion and excitement was quickly politicized. Residents from different socio-demographic backgrounds in the surrounding areas, all of the sudden, were eager to voice their opinions. In August 2008, less than two months after the lake was seized, the communities in PL came together and participated in a public demonstration in Caráz. Women from Cruz de Mayo, and school children from Caráz

[50] Ever since the 1940s the Peruvian government's approach to disaster prevention in the Cordillera Blanca has consisted of draining and damming glacial lakes, an effort that since the 1950s has been explicitly guided by development efforts. For more information see Carey, 2008.

and Campiña marched on the streets to repeating: “Parón is not for sale, Parón should be defended!”(see Figure10 and Figure11).

A discourse equating the lake’s water to life, and the maintenance of its governance arrangement to the community’s survival, appeared throughout Caráz, Campiña, and Cruz de Mayo. First, political speeches that suggested that the survival of the recently established water governance arrangement relied on people’s willingness to fight for it were aired on the radio and published on local newspapers articles. Subsequently, this political rhetoric began spreading through the public. Residents went on the streets and marched to support and reinforce the message. Cruz de Mayo, Caráz, and Campiña were united against their oppressors. Judging from how protests went protests, it appeared that they were willing to do anything to defend their water.[51]

Figure 10: School children from Caráz and Campiña protesting against water governance of Parón (9/11/08). **Source:** http://www.youtube.com/watch?v=BSFwrPrMzGQ

While seizing the lake raised awareness about water rights and governance, generated

[51] Demonstrations were charged with strong sentiments. The sense of urgency that was spreading reinforced the need to defend Parón’s water. This is clearly represented by the words captured on a video recording from a high school student during a public protest: “If possible, I will give my life to every drop of Parón’s water” (Salvemos Parón , 2008).

communal cohesion, and fostered local civil unrest against the previously imposed water governance structure, the reaction at the regional and national level was quite different. Soon after locals occupied the lake, the conflict grabbed the attention of high officials in Huaráz and Lima. Authorities in Lima reacted by holding a series of negotiations that included the participation of local and national government officials. However, since the negotiations excluded representatives from the local community, negotiators were unable to find a fix to this problem. Officials in Lima assumed that the local voice was fairly represented by the municipality. The mayor was present in all discussions, negotiating with congressmen and high representatives from the Ministry of Agriculture, Ministry of the Environment, and the Ministry of Energy and Mines. While he was gaining recognition and power through this conflict, local irrigators, even though one of the most important stakeholder groups in this conflict, continued to be excluded from the decision making process.[52]

Figure 11: Indigenous women from Cruz de Mayo protesting against water regime in Parón . **Source:** http://www.youtube.com/watch?v=tjO6R0AtOhk

Reacting to their marginalization and the pressing need to secure a safe management of the

[52] Rather than not being invited to the negotiation process, local water users were excluded because the negotiations took place in Lima instead of Caráz. This made it impossible for irrigator representatives to attend.

lake, Cruz de Mayo asked the authorities to call a meeting to transfer the lake's management to a multi-sectoral administration commission. The campesino community also requested to be included as a separate party in the negotiations. It is in this context that the negotiations between stakeholders in this conflict began. However, before addressing the negotiations, to provide context to the discussion, the following section will introduce the stakeholders.

STAKEHOLDER ANALYSIS

This section introduces the main actors, their positions, underlying interests, and strengths and weaknesses. While I examine each stakeholder in detail, I connect perceptions, and attitudes to broader spatio-temporal dynamics. In addition, as a segway to the subsequent negotiation discussion, this section brings to light the stark differences between stakeholders, why the lack of trust is so prominent, how parties have used their sources of power, and how the roles and behaviors taken by each party have deterred the negotiation process and thus aggravated vulnerability in the area.

a. CRUZ DE MAYO

Cruz de Mayo is an indigenous community located in the upper PL watershed. With approximately 800 households, this community has its own government[53] (Carey et al., 2012). It is governed by a board, and each of its 14 sectors is represented by a delegate who works closely with the board (Personal communication, Cruz de Mayo community member, August 6, 2011). According to non-profit representatives working closely with Cruz de Mayo, this community is especially organized, highly cohesive, and very respectful of its internal hierarchies (Personal communication, social scientist, June 24, 2010). The large majority of its residents rely on subsistence farming. Because their community is located at a higher altitude and secluded from

[53] Cruz de Mayo leaders describe comuneros as those who belong to the community and have been actively involved in communal work for several years. Thus, given that the majority of these are registered and represent their families, community leaders interviewed estimate that Cruz de Mayo is populated by 800 approximately households.

larger urban centers (Figure 12), their standards of living are drastically lower, and their sources of livelihood are very limited.

Throughout the conflict, representatives of Cruz de Mayo have had one main interest; to secure their livelihood. According to social scientists working in the area, this community lives in extreme poverty, and their residents' sole livelihood source depends on their secure access to water (Personal communication, local non-profit worker, June 7, 2010). Hence, Cruz de Mayo fiercely opposes the inclusion of Duke to the local water governance. In addition, given that in 2010 PNH created a tourism development plan for this area (Personal communication, PNH reprentative, August 1, 2011), the community hopes to increase their local tourism-derived income, and to diversify their livelihood sources. As such, they hope that the new management regime will increase the lake's water volume in order to improve the aesthetic appeal of the lake.

In addition, Cruz de Mayo has approached this conflict with another, less pressing but equally important interest; to have a voice (Hirschman, 1970). In Parón, as in the rest of Peru, indigenous populations have long been marginalized and silenced. Through this process, given that they already have a firm leadership and organizational structure, Cruz de Mayo is further solidifying as a community. They are realizing that they too have a voice, and that they too should be heard. Thus, this conflict has helped Cruz de Mayo develop the confidence it needed to better interact with other communities and the government.

Cruz de Mayo's metamorphosis is taking place partially because their leaders have been working closely with CEAS - a religious organization that aims to defend and promote human rights (CEAS, 2011). This religious institution has been involved in the conflict since the very beginning. Their support consists of legal advice and representation during meetings, as well as providing advice to develop a strategy to negotiate. It has also proven extremely useful because

the organization's representatives have helped the community to 'work the system'. Although critics have compared the relationship between CEAS and Cruz de Mayo to one between a puppet master and its 'puppet', it appears that CEAS has been extremely helpful in making Cruz de Mayo use their assets on the negotiations.

b. CAMPIÑA

Campiña is the agricultural area surrounding Caráz. Even though politically it is considered a part of Caráz, given that residents in this area have a different livelihood basis (agriculture), locals refer to it as a different community. Agriculture in this area is mainly commercialized locally and regionally. In very few cases it is exported (Personal communication, ALA representative, June 14, 2010). Even though residents from this area are significantly wealthier than in Cruz de Mayo, research indicates that many of the farmers find themselves being forced to move to the town of Caráz in search of a more reliable income than agriculture can provide.

Water users from Campiña seem more divided and suspicious than any other user groups. Moreover, as it appears that there are no formal channels of communication between users and their leaders, users lack sufficient information to determine how the conflict and negotiations are affecting them. However, regardless of this lack of unity, because they all hope to continue working on agriculture, and since their access to water was rendered vulnerable when Egenor was in charge of the Lake, there is strong agreement on the need to reject Egenor from the area. Additionally, much like Cruz de Mayo, they also agree on the importance of being able to diversify their livelihoods with the emergence of tourism (Personal communication, irrigator and community leader, August 7, 2011).

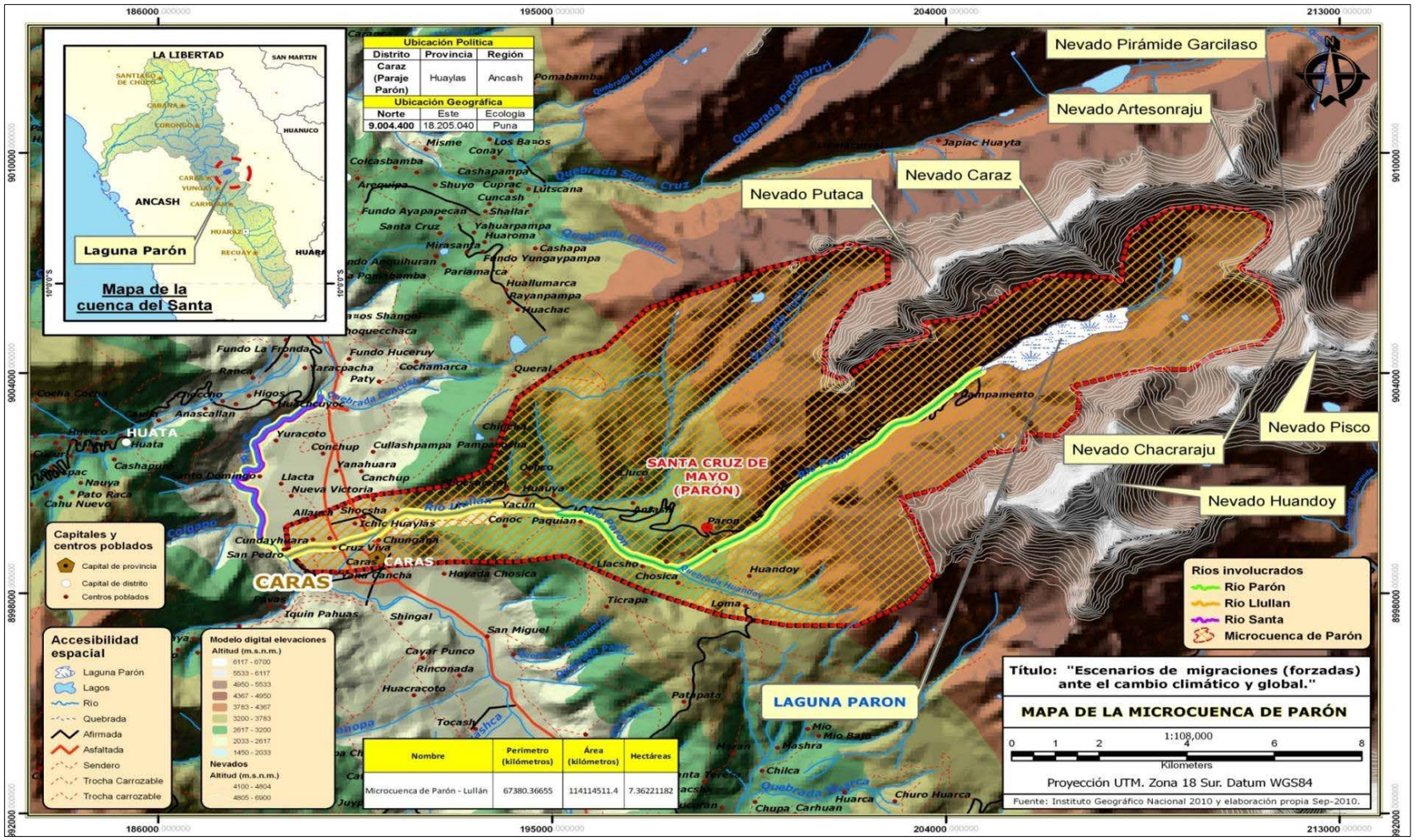

Figure 12: Parón-Llullán watershed. **Source:** Altamirano, 2012

As Campiña residents are more connected to the national society than those who live in Cruz de Mayo, they are more aware of the uneven distribution of public services. Hence, it appears that the resulting economic and social dynamics between Andean and Coastal Peru, have led to their perception of having their voice silenced, and hence, their resentment and skepticism of the national government. Even though Campiña residents have better access to education, services, and livelihood diversification, their lack of unity, their increasing suspicion even of members of their own community, and their lack of a solid, institutionalized leadership is rendering this party one of the most vulnerable ones.

c. MUNICIPAL GOVERNMENT OF HUAYLAS[54]

The local government has been represented by the same official for two terms now. His political success mainly draws from his role in this conflict. From day one, the mayor has been a strong advocate for the community. In fact, he has made several bold public statements such as, *"la lucha será hasta las últimas consecuencias"*, or "the fight will continue until the final consequences", where he alludes that he is willing to suffer whatever consequences to endorse the community all the way (Montoro, 2011). Thus, one could argue that his strategy for maintaining political power has been to side with the community in regards to the Lake's management. In addition, as he hopes to add successful projects to his lists of accomplishments, his support of tourism development, and of the improvement of the lake's aesthetic value by increasing its volume, is decisive.

However, in pursuing his interest in gaining popularity throughout the community, the mayor has sacrificed his relations with the regional and national authorities. For instance, backing up the local parties, he has made public pronunciations in which he blamed the Ministry of Agriculture and ANA for starting the conflict (El Inca, 2011). Occurrences such as this elucidate

[54] Huaylas is the province where Caráz, Campiña, and Cruz de Mayo are located.

how parties not only distrust, but also dislike each other, creating a dynamic that makes a resolution to this conflict more challenging.

d. THE NATIONAL WATER AUTHORITY

ANA is a newly formed government agency that is in charge of all water use and distribution throughout Peru. This agency was created in 2008, and among its urgent organizational goals is to implement the new Water Resources Law, a legislation that introduces a nationwide regime which is based on IWRM. The idea behind the legislation is that by fostering multi-sectorial negotiation of water and giving voice to all stakeholders, the new regime will balance economic efficiency, environmental sustainability, and social equity in the face of water stress (Autoridad Nacional del Agua, 2009b).

Ironically, throughout this conflict it appears as if this organization has failed to support its mission. While ANA should have taken the lead to advance negotiations, many argue that in its interest to steer away from political controversy, instead, they have hampered negotiations. Critics argue that they have failed to show up to some meetings, and that their position throughout the negotiation has been inconsistent because they constantly change the representative they send to negotiate. This lack of efficiency has been received with suspicion in the community. Many believe that ANA is purposely delaying negotiations so that in the end, the lake's management would have to be given back to Duke. Since the lake's water management requires expertise and financial resources, it would only be logical that ANA would support Egenor's involvement as a main actor; this company has both the expertise and financial resources that no other party can provide.

ANA appears to have two contradictory interests; while it aims to implement the 2009 legislation – which implies the formation of a multi-stakeholder committee for water

management purposes – it also hopes to find a quick fix to the conflict, which implies that Duke's representatives would have a leading role in the committee. However, unless the social problems behind this conflict are addressed, Duke will not be able to be a part of this new governance structure, and ANA will not be able to implement the legislation properly. With this in mind, it is fair to say that ANA, in its role as a leader, has put off a resolution by setting a double agenda for the meetings.

e. THE LOCAL WATER ADMINISTRATION

The ALA is the water authority's representative at local level. Their main responsibility is to provide water licenses and to ensure that all decisions at the local level are compatible with the decisions made at the national level. In PL, ALA is the party that is mostly blamed for starting the conflict. According to critics, this organization not only gave Egenor a license to release excessively high volumes of water, but also failed to oversee the license's compliance. Hence, to them, because ALA tried to evade problems with Duke Energy, it failed to establish its authority. Most important, it failed to take farmers' complaints seriously, generating the frustration that rapidly spread throughout the community.

Perception plays a big role in a conflict like this one. Often times, ALA gets blamed for plotting against the community. Locals repeatedly complained that while ALA pushes aggressively for the implementation of the new water law, its functionaries fail to educate water users on details of the legislation such as: changes from the previous law, specific requirements from irrigators, or the legislation's effects on users' access to water. Given their past relationship with ALA, locals interpret this combination of persuasiveness and secrecy as a plot to change their water uses, and to render their rights vulnerable. The organization, however, dismissed these accusations, and explained that given their time and resource pressures, they are limited to

having to 'act fast' while giving a slow training.[55]

f. UNIDAD DE GLACIOLOGÍA Y RECURSOS HÍDRICOS

Glaciología is the national institution in charge of evaluating and monitoring the behavior of glaciers and glacial lakes to prevent and mitigate the risk of natural disasters (Autoridad Nacional del Agua, 2009c). This agency works under ANA but has held a significantly different role, position, and interests throughout the conflict. In fact, this party exemplifies the importance of the role of the negotiator in shaping the negotiation's outcome.

Unlike the other government representatives, Glaciología's delegate seems genuinely concerned about the community's wellbeing. One of his main interests is to ensure a fair procedure, and that all parties understand the process and decisions. Glaciología plays a central role in this conflict because, since its leadership has been better able to gain the community's trust, the organization functions as a nexus of communication between Water Authority agencies and the local parties. In addition, given that Glaciología is a scientifically based organization, and its recommendations are based on research, it could be argued that this governmental institution has a better the capacity to arrive to a consensus with the community and much better chances to mitigate the latent risk of GLOF in the area.

g. PARQUE NACIONAL DE HUASCARÁN

PNH, was created in 1975, and declared a natural patrimony of humanity by UNESCO in 1985 (UNESCO, 2007). The rugged terrain of PHN comprises sections of both the Cordillera Blanca and Cordillera Negra (Figure 1). Within the park's territory there are four campesino communities, and within its buffer zone there are dozens more[56] (Personal communication, PNH

[55] Peru was supported by the World Bank to begin implementing the new legislation. Thus, since it is required to show progress ALA appears to be pressed to aggressively formalize people's water right. While the government aims to have a better account of the water demand versus supply, residents are afraid that by having their rights formalized their access will be changed, and that their water rights will be made vulnerable for a more 'efficient' water use.

[56] The buffer zone, or transition zone, is the area surrounding the park, where park officials attempt to minimize human impact on

representative, June 3, 2010). Thus, ever since PNH was crated, park officials have been balancing biodiversity conservation and community development. Throughout its existence, the park has aimed to diversify livelihoods through tourism, and to demonstrate to community member that they can benefit from taking care of the environment.

With this in mind, park officials' interests are somewhat different from those of the other parties. While they are neutral as to how the new governance arrangement in Parón is designed, their main interest is that the water management regime considers the preservation of biodiversity. Additionally, PNH is interested in developing the tourism industry in this area. In fact, park officials and community leaders are already having talks to develop a business plan.[57] Thus, in order to successfully develop the tourism industry, it is in PNH's interest that those who manage the lake's waters increase its volume to bring out its aesthetic value. However, as a government agency, it is also accountable to the public in the case of a natural disaster; thus, they also oppose keeping the water level too high. All in all, PNH is choosing to stay silent, and even appears uninterested in this conflict. PNH officials could be of great help to this conflict. They share interests with the community and have an affiliation with the national government. Potentially, they could serve as a liaison between the government and the community. However, based on fieldwork their contribution to the conflict negotiations has been minimal.

h. DUKE ENERGY / EGENOR

Egenor is the subsidiary of Duke Energy in charge of operating Cañón del Pato. This multinational company entered the area when the government privatized Electroperu (see Chapter Two). When acquiring Cañón del Pato, the company also became the owner of lake

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conservation areas and where they help address the socio-economic needs of the nearby population.

[57] Ideally, with the development of tourism, community members will be able to benefit in a few ways. Cruz de Mayo, in addition to profiting from selling food or lodging, they would get a percent of the profit earned entrance fees. Campiña and Caráz residents would ideally provide related services such as tour guides or restaurants.

Parón's infrastructure. ALA provided Egenor with a license to use the lake's water. Since then, Egenor, in its interest to have access to extra water when needed, has invested millions of dollars to acquire and maintain the lake's drainage tunnel. However, today, the conflict, unpredictable precipitation patterns, and a reduction of total rainfall in the area, have caused the company to experience a significant revenue loss (Personal communication, Duke Energy representative, August 5, 2011).

When interviewed Egenor representatives acknowledged past mistakes and recognized that repairing or re-starting relations with the community is an important first step, a step that will take a long time to take. Currently, Egenor is making attempts to re-connect with Cruz de Mayo; however, this effort is doing nothing but creating disputes within the community (Personal communication, Cruz de Mayo community member, August 6, 2011). While Egenor officials hope to recover their access to Parón's water, they realize that this might not happen. If they decide to give up trying with the community, they will demand a refund from the state for all the money invested on maintaining and improving the lake's infrastructure.

Negotiations over Governance: Water access and Safety

While throughout this time the overarching goal of negotiations has been the determination of a new water governance structure that would secure the different parties' water rights and mitigate the risk to natural disasters, individual negotiations have aimed to address several relevant sub-issues. The issues debated that are most germane to this thesis are: First, Egenor's legal property rights to the lake. Once stakeholders began discussing the problem openly, the first issue to be questioned was the appropriateness of having a water body - that is located in its entirety within a national park, and that serves as the only water source for a significant portion of the local population - as private property. Second, the formation of a multi-sectoral water

governance structure that will fairly represent all stakeholders' interests and that will secure the different parties' access to water. Throughout the conflict, stakeholders have shown interest, but thus far have failed at forming such a governance body. This effort has proven significantly more challenging than stakeholders were anticipating. Challenges have appeared in a plethora of ways, including the determination of participants and parties, the financing of the lake's operation by different constituencies, the ability of parties to negotiate without trust, and the almost contradictory outcomes envisioned by all parties. Third, the determination of a water management regime that would mitigate the risk to natural hazards. While the government argued for the lake to stay at a certain level, the community - distrusting the government's real intent, disbelieving the actual risk of a natural hazard, and wanting to diversify their livelihood strategies - argued for a higher level, one that in the government's eye would pose a risk of GLOF. These three issues are discussed in turn, below.

Property Rights of the Lake

During the concession transfer from Electroperu to Duke, the lake's legal property was reassigned to the private entity (Untiveros, 2010). Given that the lake is entirely within the national park, and that residents have long questioned the government's decision to 'privatize' this water body, the first topic to be discussed was Duke's legal property rights to the lake.[58] The company defended its right to manage Parón's water releases emphasizing its legal right to operate the lake, and its multi-million dollar investment for the maintenance and improvement of the drainage tunnel (Figure 13). Duke representatives also pointed out the company's unique position of having the capacity and expertise required to operate and maintain the infrastructure,

[58] According to Supreme Decree N° 002-2010-MINAM, in July 1993, it was authorized to the *Dirección Nacional de Registros Públicos y Civiles*, or National Direction of Public and Civil Registries, of the Ministry of Justice to inscribe Electroperu's estate. With this, Electroperu provisionally inscribed dominion over the property of 540 Ha that included lake Parón. When Electroperu was privatized, Duke Energy became the registered holder of the dominion.

and to secure downstream residents from natural disasters. Locals, on the other hand, formed a "commission for the recuperation of lake Parón" to claim national government agencies to rectify the framing of property rights of the lake (Untiveros, 2010).

In response to local, regional, and national pressure, the government's water authority was able to use legal technicalities found in the lake's registry in order to return to the government.[59] Consequently, in February 2010 the National Water Authority (ANA) declared Lake Parón as National Patrimony. With this, Duke Energy's legal title to the lake was revoked; however, this, by no means, meant that Egenor would disappear from PL. After all, the lake's drainage tunnel and its machinery still belonged to the company, and, even though Egenor did not have the right to manage the lake anymore, it still had legal access to Parón 's waters and was entitled to be a part of the resource management negotiations.

The revocation of the Lake's property rights from Egenor was a major leap forward for securing the local water rights; However, this did not mean that the community would enjoy secure water rights. Instead, it meant that local user groups would have to target their efforts to determining a water governance structure that would secure their rights while mitigating their risk to natural disasters.

A Just Governance Structure

The conflict's negotiations were for the most part about achieving justice. Fieldwork indicates that party representatives were concerned about securing justice for their own constituencies. Justice, as an outcome of the negotiations would imply the creation of a governance structure that distributes water equitably, and that provides equitable representation

[59] According to Supreme Decree N° 002-2010-MINAM, while Electroperu provisionally inscribed dominion over lake Parón, it failed to do request its permanent inscription.

of different stakeholder interests during decision making processes. However, the lake's governance has proven to be one of the biggest challenges to the resolution of this conflict. Even though parties agree that there is an urgent need to establish a such a governance body, this task has proven to be more challenging than they were expecting. As a result, to this day, a multi-sectoral governance team still has yet to be put in place. Consequently, for over three years now local irrigators have controlled the lake; which paradoxically secures the community's access to water, while increasing PL risk to natural disasters.

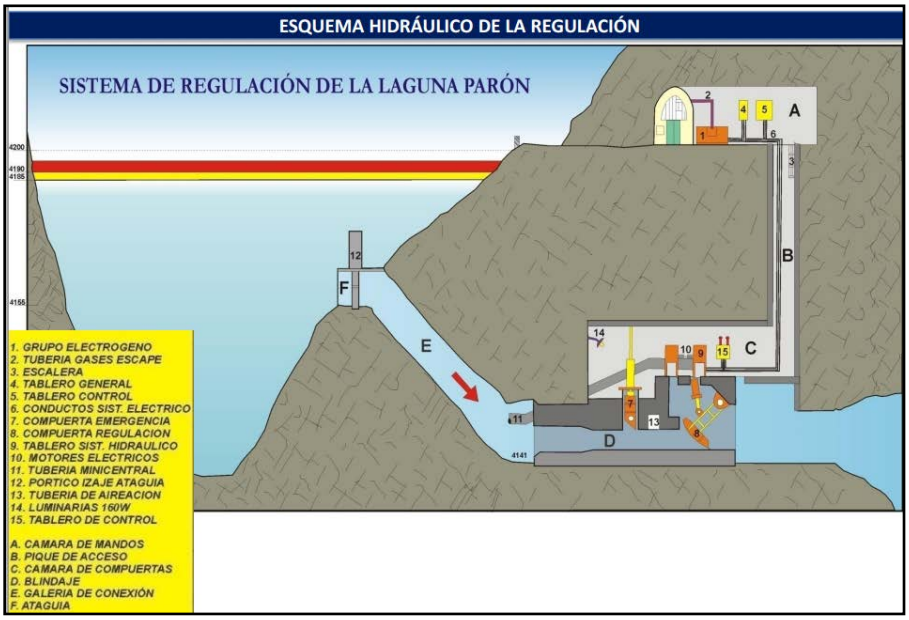

Figure 13: Lake Parón 's Drainage tunnel.
Source: http://www.ana.gob.pe/media/447119/estado_situacional_laguna_Parón .[1].pdf

Thus far, parties have not been able to create a governance team because there are many issues that resulted from the conflict that prevent any type of agreement. First of all, the government's lack of transparency has raised suspicion amongst community members. For instance, in 2010 state agencies in Lima declared Parón to be in state of emergency, and mandated the creation of an *Operations Committee.*[60] This team was responsible for planning

[60] According to Legal Resolution N°. 737-2011-ANA this committee was to be lead by ALA and composed of the following members: a representative of PNH, the major of Caráz, the president of campesino community Cruz de Mayo, the president of

and overseeing water use based on its availability. Even though all affected parties were present and representatives were all decision makers, the committee failed to arrive at any agreement. According to local user-group's representatives, while a plan was being drafted by negotiators in Caráz, a different one was drafted by ANA in Lima. Representatives argue that to them, the meetings, and even the work they did, seemed like a gimmick. A disgruntled negotiator once told me "people from Lima come here to trick us. They bring already-made minutes and they want us to sign them" (Personal communication, local engineer, August 3, 2010).

Second, while community representatives accuse the water authority of approaching the negotiation table with preconceived outcomes, they do exactly the same thing. For instance, before the lake was seized the local population demanded that the lake be governed by a multi-sectoral committee; however, they also requested that the committee release water at a specific volume (one that only met the community's interests). This example is important because it shows how parties are incapable of perceiving their own contribution to the conflict's escalation. Most importantly, however, it shows how the different parties approach the negotiation with preconceived, and sometimes opposing, expectations of what the multi-stakeholder governance team will do for them.

Finally, the biggest challenge to the creation of a just governance structure is the lack of strong leadership and representation in participating parties. In a time like this, it is crucial that parties have a strong leadership to be able to accurately represent their constituencies. Unfortunately, this has not been the case in Parón. The responsibility of managing the lake and of having to acquire funds for it has been detrimental to the cohesion of local groups. For instance, water users in Campiña are often excluded from decisions regarding the lake's

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the irrigator's commission, and a representative of non-agrarian users.

governance. This information gap is then filled by false reports from the media, generating suspicion among users. Consequently, when leaders approach water users requesting financial contributions for the lake's management, they face resistance from users. Now, not only is Campiña weakening as a group because users feel like they are being abused by their leaders, but also Cruz de Mayo users now view Campiña as not fully committed to their cause. In this context, where there is a lack of transparency and where trust is weakening within parties and allies, it will be challenging for groups to be able to secure their access to water.

A governance structure that is just, that all parties trust, that makes them feel represented, and that ultimately secures the different parties' water access will not be created until the previously mentioned issues are dealt with. Institutional processes need to become more transparent, leadership needs to incentivize rather than deter group cohesion, and negotiating parties need to begin creating common views on what multi-party governance outcomes will do for them. Until then, it appears that the community (with occasional government interventions) will continue to control the lake. While this arrangement secures the community's access to water, it also deprives Duke from their water rights.

Water Management: "Safety vs. Equity"

The lake's occupation was a source of great concern to authorities in Huaráz and Lima, as they assumed that irrigators' water management would prioritize irrigation and tourism development needs over safety to natural disasters.[61] This area is well known for its high risk of GLOF. In the 1970, the neighboring town of Yungay was completely buried by a landslide, killing almost 20,000 people (Instituto Geofísico del Peru, 2009). Soon after the lake was seized,

[61] Locals argued that the lake's water level should be kept higher than the security level recommended by glaciologists. The logic was that the higher the lake's water level, the greater its aesthetic value. With a more beautiful lake, more tourists will visit the area. With this scenario local will have the opportunity to diversify their livelihood.

with the permission and participation of community members, authorities from Lima visited Parón several times. Their goal was to assess the risk of a lack of maintenance of the lake's infrastructure (see Figure 13), to monitor the water's level, and to determine the proper water release volume. Since then the government and community have engaged in a series of debates over achieving an enhanced water management regime, one that will simultaneously consider the water needs of user groups and the mitigation of risks of GLOF.

Aiming to reduce the risk of hazards in the area, during the negotiations the government has issued a state of emergency for Lake Parón twice. This status authorized them to operate the lake for a set period of time. However, their entrance to the lake and the implementation of what the government perceives as a safe water management practice has been no easy task. Past experiences with the government where 'risk mitigation' was used to empower other parties to govern water, and ultimately to make their water rights vulnerable have proven key in creating the obstacles that the government is facing today. The community's distrust in the authorities, their fear of losing access to water, and their reluctance to believe the actual presence of a risk appeared to be the biggest challenges to implement a water management regime that proves safe to nearby residents.[62]

FROZEN NEGOTIATIONS

Before the lake's seizing, community residents were looking to negotiate their water use and access. However, once they held control of the lake, having the upper hand, they decisively refused to negotiate with Egenor representatives (Personal communication, local non-profit worker, June 7 2010). Once again, this conflict shifted in May 2011. The Constitutional Court

[62] This fear reigns in the community to this day, and at the time, it was aggravated by the newly emergent discourse that equates water to life. Consequently, most residents either regarded scientific warnings as false- especially if they came from the government - or prioritized their access to water over their security. This is well represented by the phrase often repeated by locals: 'I would rather die in an avalanche than of thirst' (Field notes, 2010).

published resolution EXP no 00834—2010-PA/TC, which mandated that the water authority evict the community from the lake, and return the control of its infrastructure to Egenor[63] (Tribunal Constitucional, 2011). This event has frozen all attempts to negotiate because, on the one hand, it has further aggravated the community's distrust in the government. On the other hand, it appears to have given some government officials the excuse to escape their responsibilities, since it is expected that a different government agency will solve the conflict.[64] The lake's management is still under the community's responsibility, but since the resolution the situation has changed. The community is less open to negotiate with the government and its members are psychologically prepared for 'whatever comes' (Personal communication, local government representative, August 11, 2011). According to interviews, neither the government nor Egenor will use force to enter the lake. Thus, it appears that this resolution not only has had the opposite effect to its original intention. Rather than securing Egenor's water rights, they have been rendered more vulnerable. Also by causing all negotiations to freeze, it has further instilled the lake's management responsibility on the community, and consequentially increased the risk of natural hazards in the area.

In an effort to re-open negotiations and attract more media attention to this case, the CEAS, which has been assisting Cruz de Mayo throughout this process, has reached out to important political figures. Among those who received a plea was the first lady of Peru. In September 2011, she, pointing to ANA's inefficiency, requested the Ministry of Energy and Mines to accelerate the creation of the *Comité de Gestión,*[65] or management committee.[66] This letter

[63] In Peru the Constitutional Court is the organization with maximum authority to interpret and control the constitutionality. It guards that the legislations or acts of other governmental entities do not contradict the constitution.
[64] This attitude was apparent amongst most ANA and ALA functionaries who participated in this research. Even though these entities were directly responsible for enforcement of the resolution, it appeared that to these public servants, the problem's solution was now a responsibility of the judge.
[65] Comité de Gestión is the multi-stakeholder committee that according to the 2009 water law is responsible for planning water use in each watershed.

grabbed attention from most prominent newspapers and TV channels in Peru (America TV, 2011; Panamericana, 2011). Sadly, rather than exposing the environmental injustice in this case, most press coverage questioned the first lady's authority for making such a request (El Comercio, 2011). Although some reports did point out the ecological dangers of the conflict, none addressed social justice issues. Regardless, the conflict is now being watched by politicians including the president and Prime Minister (Llontop Samillán, 2011).

CONCLUSION

The Parón water conflict provides important lessons that can be of great help to better manage future disagreements over water use and distribution. It is likely that Parón's case represents only the beginning of a series of water conflicts to come in the country. Peru is prone to face an increasing number of water conflicts for several reasons. First, the country faces imminent water scarcity challenges. Second, as this thesis argues, there are no mechanisms to support an equitable sharing of water among competing users. Finally, the central government is now beginning to implement its new de-centralized water governance structure that while providing a channel for disenfranchised users to have a voice in advising, it continues to direct important decisions to authorities in Lima. This decision making process increases the chances that disagreements of this nature will ignite since the central government buttresses neoliberal policies that favor 'efficient' water use in the coast.

This conflict can useful to guide future water governance de-centralization efforts because it highlights those aspects of the implementation that have proven challenging to the Peruvian water authority. The lessons drawn from this case study are especially applicable to future implementation efforts throughout the Andes. Much like in Parón, Andean water users elsewhere

[66] http://www.scribd.com/doc/73067863/Carta-de-Nadine-Heredia-a-Carlos-Herrera-Descalzi, last accessed: 4/16/12.

in Peru have been marginalized for a long time (Gelles, 2000; Tradwick, 2003). As the government struggles to de-centralize the national water governance structure, Andean irrigators, filled with suspicion, resist governmental efforts. Irrigators in the highlands, especially indigenous farmers, fear that governmental efforts, in their aim to buttress economic development, will favor private interests and only render their access to water more vulnerable.

In addition to providing lessons for future water governance issues, this conflict carries particular traits that will hardly repeat elsewhere in Peru. The Parón water conflict appears to be unique and especially convoluted, because not only does it involve the usual political, social, economic, and cultural components that most socio-environmental conflicts have, but also it includes a risk and vulnerability factor. This particularity brings out important questions regarding the role of risk and vulnerability in shaping the conflict, and thus, influences important water management decisions.

This conflict is unique because its risk and vulnerability aspects are unlikely to repeat elsewhere. These particular aspects have become intertwined with politics in many different ways. Even though there is a latent risk of outburst flood in the area, the way in which 'risk management' is being used to secure the interests of some, and how lightly is being taken by some others begs questions regarding both the role that vulnerability plays in shaping water governance and the role that the determination of a water governance body is playing in shaping vulnerability. The chapter that follows examines the relationship between water governance and vulnerability.

CHAPTER 4

WATER VULNERABILITIES: POLITICS, GOVERNANCE, AND DISASTERS IN PARÓN

INTRODUCTION

Throughout the escalation of Parón's water governance conflict, multiple ideologies and discourses have appeared and disappeared, shaping perceptions, attitudes, and conversations between stakeholders. One such argument that particularly caught my attention pushed me to approach this case study in a different manner:

> *'Prefiero morir de una avalancha que de sed!'* or 'I would rather die from an avalanche than of thirst!'

During fieldwork, I heard this rhetoric countless times on the radio, TV, and even while conducting interviews. This phrase was being repeated continuously by enthusiastic PL residents, from community officials, to leaders, irrigators, students, and even local residents who weren't directly related to the conflict. Although I realize that this rhetoric emerged as an ephemeral political tool in response to the government's apparent threat to take away the lake's water control, to me, it is fundamental because it brings to light a larger and more intricate connection between lake Parón's water governance and PL residents' vulnerability.

Ever since the 1960s, when experts confirmed lake Parón as a hazardous environment, water governance decisions and processes have been closely tied to conversations of vulnerability and hazards[67] (Carey, French, & O'Brien, 2012). According to local experts, the lake's drainage tunnel construction was initiated to prevent a climate-related outburst flood (Personal communication, scientist and government representative, August 2, 2011). The reliance on this technology has had two opposite effects on the local vulnerability. On one hand,

[67] For more information on the lake's governance historical background refer to the 'Water Conflict in Parón' section in Chapter Three.

by allowing experts to control the lake's water management, it has provided safety to local residents and mitigated their risk of GLOF. On another hand, allowing experts to operate the infrastructure has politicized the use, management, and regulation of water (Ioris, 2012; Mehta, 2007). Hence, it has rendered the local population more vulnerable by limiting their water management decision-making power and ultimately jeopardized their access to the resource (see Chapter Three).

In this chapter, my main goal is to provide a close examination of the ways in which water governance and vulnerability in Parón shape and re-shape each other. For this, I will use a political ecology (PE) approach combining literatures on water governance and vulnerability. Currently, political ecology of natural resources has made significant progress on water governance research. Geographers have successfully elucidated social justice implications of water governance institutions, organizations, and processes, including water privatization (Bakker, 2003; Budds, 2004), integrated water resources management, water technologies (Carey, French, & O'Brien, 2012; Jasanoff, 2003), and social struggles (Perreault, 2005). Similarly, they have made remarkable progress in vulnerability research. While some have advanced knowledge about impacts of a single environmental event and risk mitigation (Blaikie et al., 1994; Pelling, 2001), others have brought to light the human dimensions of vulnerability. In the process, they have uncovered the role played by political and economic powers, class conflict, and processes of marginalization in producing vulnerability (Bohle, 2001; Cutter, 2006; Fordham, 2004; Ribot & Peluso, 2003; Sultana, 2010).

While geographers have made great advances in both environmental governance and vulnerability studies, these bodies of literature have been combined mostly to point out ways in which resource governance creates vulnerable conditions by distributing resources inequitably

(Lynch, 2012; Mehta, 2007; & Peluso, 2003; Smucker & Wisner, 2008; Sultana, 2011). In this chapter, in addition to contributing to this argument, I bring to light how Parón's water governance is also connected to vulnerability through the mitigation of natural disasters.

I conceptualize governance and vulnerability as having a two-way relationship. While I understand the effects of water governance on vulnerability as channeled through water regulation and management decisions, I view the effects of vulnerability on water governance as mainly manifested on the ways in which discursive conceptualizations of vulnerability shape the determination of governance structures. In an agitated political environment, such as the one that gave birth to the conflict in PL, it was imperative to bring to light the way in which politics have: (1) mediated the use, management, and regulation of water; and (2) shaped, and been shaped by vulnerability and the risk of outburst flood in Parón.

With this analysis, the links between vulnerability, water management, and water governance will also become evident. By water management I refer to the activity of planning, developing and distributing the resource for its use. By water governance I refer to the economic and political coordination that shape (1) institutional arrangements, political participation, and spatial scales by which decisions making with respect to water is made, and (2) the production of social order via the management of water. And by vulnerability I refer to the combination of the potential damage or loss of life from exposure to contingencies, the sensitivity of people, places, and ecosystems to the stress, and the capacity to recover from stress.

Given Parón's unique combination of socio-political and environmental settings, these links are of special importance to understand the complexities of the conflict and the ways in which the livelihoods of local residents depend on the conflict's outcome. In this thesis, I understand water management as the fundamental connection between water governance and

vulnerability. However, far from arguing that Parón's problem is one of water management, I suggest that while management lies on the surface, buried underneath is a much more convoluted governance struggle. This struggle that is grounded on the social and political instability in PL, engenders a fickle management regime that constantly drives PL residents into and out of vulnerability. As management teams continue changing, and water distribution regimes fluctuate according to the interests of those in charge, the vulnerability that nearby residents experience transforms. The management of Parón's water makes nearby residents vulnerable primarily by increasing the risk of a glacial disaster and by making their access to water vulnerable.

For this chapter's analysis, I rely on the PE approach. In the first section, I undertake a review of this intellectual tradition to then explain the analytical framework I rely on for my assessment. I then use a brief review of research on vulnerability theory (Adger, 2006; Cutter, 2006; Langridge, Christian-Smith, & Lohse, 2006; McLaughlin & Dietz, 2008; Ribot, 2009; Wisner et al., 2004) to conceptualize vulnerability in a way that better suits my research question and case study's context. In this section, I also provide an overview of environmental governance (Bridge & Perreault, 2009; Himley, 2008) and in particular water governance (Bakker, 2003; Budds & Hinojosa, 2012; Perreault, 2005). The section is followed by an analysis of the relationship between water governance and vulnerability. Borrowing from Budds and Hinojosa's (2012) examination of the relation of water governance and mining in Peru, I apply their analytical lens to my case study and recognize the relation between water governance and vulnerability in Parón as embodied in, and expressed by, a range of 'moments'. As such, I explore these 'moments', or instances: water flows and management, technology, institutions, discourses, and - given the particularities of Parón – negotiations, to bring to light the links between vulnerability and water governance.

VULNERABILITY AND ENVIRONMENTAL GOVERNANCE: A POLITICAL ECOLOGY APPROACH

PE is an approach to geography that analyzes the "complex relations between nature and society" (Watts, 2000, p. 257) by examining the politicization of nature through processes of development, environmental resource management, and struggles over resources and livelihoods. Even though PE lacks a coherent theory, it does encompass a solid set of critical concepts, methods, and theories from which to explain problems (Robbins, 2004). This approach is based on the intersection of ideas from fields including cultural ecology, ecological anthropology, political economy, and peasant studies (Watts, 2009). As such, political ecologists see environmental challenges in social terms. They view the connection between the environment and society as mutually causal, interactive, and dialectical; i.e. the class-specific perception of challenges and solutions for resource management, or the ways in which the power of classes is affected by resource management.

Political ecologists have facilitated critical understandings of policy efforts and political issues that relate to sustainability, global change, and neoliberal management of resources (Zimmerer, 2010). Particularly, PE has greatly advanced understanding of environmental governance. Numerous publications in environmental governance have used PE to critically analyze topics relating to social power, political economy of resources, politics, property, and the environment (Blaikie and Muldavin, 2004; Le Billon, 2008; Wolford, 2004).

Political ecologists view institutions – i.e. resource rights, policies on resource extraction and conservation, or management practices and social norms - as the link between "socially differentiated communities and biologically differentiated environments" (Peet & Watts, 1996, p. 25). More specifically, geographers seek to elucidate how these institutional arrangements shape

the ways in which nature and society relate to each other, and how this relationship facilitates environmental and social regulation within a regime of accumulation (Bridge & Perreault, 2009). For my assessment, I rely precisely on this understanding of the role of institutions, and of how political economy shapes the management of resources through different forms of access and control.

In my analysis I use the PE approach for several reasons. On one hand, the perspective from which I analyze this case study borrows from PE's theoretical understanding of resource management. I recognize the management of water in terms of how political economy determines the capacity to manage the resource: through forms of access, control, and exploitation and through the understanding that one person's accumulation is another person's degradation (Watts, 2009). On another hand, its analytical tools -multi-scalar analysis and the understanding of discursive formations and practices - allow for a solid examination of the different ways in which water governance in Parón and PL residents' water vulnerability are interrelated.

A multi-scalar analysis serves to elucidate the complications of water governance and the role played by politics in shaping institutions and structures of governance, and ultimately, in determining access to water. For instance, the transformation of the lake to a reservoir (Carey, French, & O'Brien, 2012), or the emergence of a new water regime in Peru in 2009 are issues that were originally driven by global politics. Both have had a significant effect on the lake's water management and have affected the ways in which local residents from Cruz de Mayo, Campiña, and Caráz access water.[68] Using a multi-scalar lens uncovers how the space where many of the identified vulnerability drivers originate is not necessarily the same as the one where

[68] In 2009, the Government of Peru approved a water resources management reform program that was designed to increase the 'efficiency' of water use; and thus change its contemporary use. The IADB contributed to this program with a loan of $10 million dollars (IADB, 2009).

loss will be potentially suffered. This is the case especially for vulnerabilities generated by development processes. For instance, it was in Lima that the privatization of Cañón del Pato, and the use of Lake Parón's waters for purely hydroelectrical purposes were decided.

In addition to multi-scalar analysis, I use discourse analysis. As political ecologists do, I examine the ways in which realities are rooted in social and ecological conditions, and how these conditions are manifested in daily life (Peet & Watts, 1996). I use this analytical lens to uncover how the construction and meaning of knowledge shape policy and practice, and how these, in turn, affect the forms of access and control over resources (Leach & Mearns, 1996; Moore, 1996; Peet & Watts, 1996; Pulido, 1996). As I analyze the conflict in PL, I illuminate the role of politics in shaping the governance-vulnerability relationship. More specifically, I explore how political discourses that inform water management shape access to water and exposure to GLOF. Before delving into this analysis, I consider it necessary to review political ecology conversations on vulnerability and environmental governance.

Political Ecology of Vulnerability

In their effort to "understand the complex relations between nature and society" (Watts, 2000, p. 257), political ecologists have long been engaging with the study of vulnerability, risks and hazards (Clark et al., 2000; McLaughlin & Dietz, 2008; Wisner et al., 2004). Natural hazards research was one of the main precursors to PE. Considerations of hazards and vulnerability have been fundamental to PE since its nascent years. White (1945), in his study of flood management, challenged the then customary way of dealing with floods, arguing that heavy reliance on engineering to solve hazards fails to deal with the underlying human problem. With this assessment, he made a tremendous contribution to approaches of human-environment interaction (Robbins, 2004). Watts pioneered a different approach towards hazards theory (1983). In his

critique of hazards research and human ecology, he 'denaturalizes' hazards that were fundamentally social – such as famine. With this piece, Watts becomes one of the first scholars to introduce politics to the assessment of vulnerability. With an equally influential contribution, Blaikie, in his 1985 *Political Economy of Soil Erosion in developing Countries*, drew a causal link between soil erosion and a regime of accumulation by elite class interests. With this and later works (Blaikie and Brookfield, 1987) many concepts that are key for PE - including a cross scale chain of explanation, and the perspective of a broadly defined political economy – become used for the first time.

Oliver-Smith argues that vulnerability is fundamentally a political ecological concept because it is the "conceptual nexus that links the relationship that people have with their environment to social forces and institutions and the cultural values that sustain and contest them" (2004b, p. 10). Many geographers have tracked the evolution of vulnerability tools and methods across the fields of resource management, social change, and climate change (Adger, 2006; McLaughlin & Dietz, 2008; Oliver-Smith, 2004a; Ribot, 2009). There have been two salient traditions within vulnerability research: disasters research and research on entitlements (Adger, 2006; Cutter, 2006).

As Ribot (2009) explains, the entitlements and livelihoods approach is characterized by identifying multiple causes for a single outcome. Research on entitlements was originally driven by the need to understand food insecurity (Adger, 2006). Using this approach scholars have conceptualized vulnerability as "the lack of sufficient means to protect or sustain oneself in the face of climate events where risk is shaped by society's provision of food, productive assets, and social protection arrangements" (Adger, 2006, p. 270). They view risk as inherently social. The concept of vulnerability in itself represents a critique to the technocratic approach towards

disaster management because it emphasizes what makes communities dangerous. Populations are vulnerable because they are exposed to hazards but also because they experience marginality that drives them into a state of "permanent emergency" (Bankoff, et al. 2004, p. 30). Critics argue that this approach to vulnerability underplays the important role of both ecological and physical factors.

In contrast to social constructivists, scholars using the risk-vulnerability framework have tried to integrate knowledge of physical science, social science, and engineering to explain linkages among their elements (Adger, 2006). Rather than looking for causes of a disaster, they are concerned with evaluating the impacts of a single climate event and predicting the damage caused by fluctuation from normal environmental conditions (Ribot, 2009). They view vulnerability as a "dose-response relation between an exogenous hazard to a system and its adverse effects" (Fussel & Klein, 2006, p. 305).

In recent years, vulnerability theorists have worked to better connect the human and biophysical factors. For instance, Ribot (2009) uses a framework that links these two views and maps out the causes of vulnerability from each unit at risk - individual, group, household, community, and region - to outline a policy research agenda on climate change vulnerability. This model views the entire system as a single, integrated unit and accounts all biophysical and social factors as shaping the vulnerability of the unit being studied. I view both social and environmental causes as important parts of a single system, accordingly I borrow from this particular framework for my analysis.

By placing social and ecological drivers under a single system, this model locates environmental stresses within a social framework - a fact that, as the author argues "strengthens environmental arguments by making it clear how important … the quality of natural resources is

to social wellbeing" (Ribot, 2009, p. 8). While I agree that nature is fundamental for the wellbeing of human kind, I do not see humans as ontologically distinct from nature, and disagree with the subjugation of nature, especially when it comes to risk-mitigation efforts.[69] Similar to Cutter, I believe that "The ideology of conquering or taming nature … rather than living in harmony with it, was (and still is) the driving force in the production of the physical vulnerability" (2006, p. xxii). It is the technocratic approach that was used to address the problem in Parón in the late 1960s that has caused PL residents to be in an even more vulnerable situation today. After Lake Parón was surveyed and classified as an unstable moraine-walled lake, to mitigate this latent hazard, the government embarked on a project to lower the lake's water level (Carey, French, & O'Brien, 2012). By building a drainage tunnel in Lake Parón, the risk of an outburst flood began being 'controlled' with the regulation of the lake's water surface level.

Vulnerability Framework

Based on Cutter's (2006) work, I understand vulnerability as the combination of the potential damage or loss of life from exposure to contingencies, the sensitivity of people, places, and ecosystems to the stress, and the capacity to recover from stress. As such, I view vulnerability as a dynamic process that "expresses changing social and economic conditions in relation to the nature of the hazard" (Lewis, 1999, p. 14) and that "is determined by a combination of a set of variables such as class, gender, age, ethnicity and disability" (Wisner, 1993, p. 131-133).

Recent debates in the vulnerability and adaptation literatures in geography emphasize the importance of recognizing how interactions between global environmental change and

[69] Scholars have rightfully argued that flawed policies that address symptoms and not causes, are based on views of nature as subjugated to humans (Oliver-Smith, 2002).

globalization (1) facilitate domination and create "root causes of vulnerability" (Pelling, 2012; p. 60); and (2) foster a dramatic change in contextual conditions that "affect exposure and responses to future global change processes" and thus create new patterns of vulnerability (Leichenko & O'Brien, 2008; p.32). In this analysis, while I acknowledge the importance of "wider social processes" (Pelling, 2011, p. 85) in producing multiple stressors, I place particular emphasis on the local dynamics, which are more "amenable to action within national and local political space" (Pelling, 2012, p. 59).

In this analysis, I include social and environmental factors contributing to vulnerability. Since my objective is to identify the ways in which vulnerability and water governance affect each other in conflictive PL, I place emphasis on social drivers including the struggles for power behind the creation of a new water governance body, the emergence of 'community politics'[70] (Peet & Watts, 1996, p. 25), and the lack of political and economic equity[71] (Wilder, 2008). I also consider biophysical drivers, such as climate change, and especially the latent, but serious, risk of outburst flood. It is precisely because of how these biophysical risks have been dealt with in the past - with the use of technology - that I conceptualize social and environmental drivers of vulnerability in PL as being under a 'single system' (Ribot, 2009, p. 8). Underlying my analysis is the understanding that the use of technology has allowed water management to be the link that connects environmental and social variables.[72] While risks and vulnerability are, to a certain

[70] In this study I understand the community 'in terms of hegemonies' (Peet & Watts, 1996, p. 26). As I mention in Chapter Three, soon after the lake was seized, locals' opinions and forces were unified against the bigger enemies: the national government and Duke Energy. However, soon after the community faced the responsibilities of financing and making decisions in regards to the lake's water management, they divided into sub-groups according to their interests, and leaders became less transparent in their decision-making process.

[71] In her analysis, Wilder (2008) recognizes two different types of equity, political and economic equity. Economic equity refers to resource access and affordability. Political equity, on the other hand, relates to institutional transparency and citizen participation in the process of design and implementation of resource policies.

[72] The analysis presented in this chapter is in conversation with, and largely rooted on, the technonatures literature (Escobar, 1999; Giglioli & Swyngedouw, 2008; Haraway, 1991; Ioris, 2012; Loftus, 2006; Sultana, 2013; Swyngedouw, 1996). My assessment implicitly highlights the ways in which politics of nature shape nature-society relations and how these are increasingly "technologically mediated, produced, enacted, and contested" (White & Wilbert, 2009. p. 6). As such, I recognize the important role that non-humans, or in this case water technologies, play in determining different hydro-social relations; While

degree, being controlled by water management, it is also the management of water that has been tainted with Parón's current political turmoil, and that determines the use and distribution of the resource. In other words, it is because of the construction of floodgates in Parón, and the consequential ability to manage the lake's waters, that the water governance structure, and political stability in the area, can strongly shape the risk of outburst flood, but also that perceptions of risk and vulnerability related to the lake's water can affect the governance arrangements.

While acknowledging larger environmental and social processes inducing vulnerability to PL residents and water users (indirectly addressed in Chapter Two), I limit my analysis to the factors that are directly related to the conflict and the lake's water management. In what follows of this chapter, I use the term *water vulnerability* to refer to the different vulnerability drivers that derive directly from Parón's water management.

WATER GOVERNANCE IN POLITICAL ECOLOGY

Nature-Society scholars in geography have been increasingly interested in environmental governance (Zimmerer, 2010). Most commonly, scholars have used a political ecology approach to problematize the ways in which nature is being governed. In a review of environmental governance literature, Bridge and Perreault (2009) found that as a consequence of its increasing popularity, geographers have given the subject a number of disparate, and at times contradictory, meanings. I consider it necessary to elaborate the way I conceptualize environmental (water) governance.

The term governance alludes to "the trend away from state-centric forms of social and

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I acknowledge the tremendous importance of this body of literature, given the central arguments to be made in this chapter, I consider a comprehensive review of it beyond the scope of this analysis.

economic regulation" (Himley, 2008, p. 434), and highlights the growing influence of non-state actors. Environmental governance explains important changes in the spatial, administrative, and political relations of governing nature, and brings to light how such modes of governance produce new 'socionatural arrangements' (Budds & Hinojosa, 2012, p. 121). The understanding of environmental governance from which I base my analysis borrows from two different political ecology approaches to environmental governance: governance as problematic of state re-regulation and as political participation (Bridge & Perreault, 2009).

The view of environmental governance (and water governance) as a form of state re-regulation is based on the understanding that participation of multiple non-state actors in governing processes shapes the use, control, management and regulation of nature to ultimately reinforce a given regime of accumulation (Bakker, 2003; Budds, 2004; Swyngedouw, 2007). As posited by Bakker (2003), the orientation of environmental governance towards market-based approaches was made possible by changing the social relations, material practices, and discursive representations of the environment. In the case of Peru, the new legal and institutional water governance framework requires a more formal relationship between state organizations and local water user groups (Budds & Hinojosa, 2012). Since this framework is built on the basis of an economistic representation of water, and because campesino water systems are based on a fundamentally different representation of water, its implementation on highland areas is proving to be challenging[73] (Lynch, 2012). In the case of the PL watershed these difficulties are many. For instance, an important point of disagreement between stakeholders is the formation of a *Consejo de Cuenca,* or river basin council.[74] Government representatives from ANA and ALA, continue attempting to reinforce a regime of accumulation to the watershed by pushing for the

[73] For more information on different perceptions of water in Peru, see Gelles, 2000 and Tradwick, 2003.

[74] The new Water Resources Law, by shifting the institutional framework from a centralized approach to an integrated framework at the watershed level, envisioned the creation of the *Consejos de Cuenca* to make significant decisions such as the planning, coordination and agreement of the use of water (Autoridad Nacional del Agua, 2009b).

inclusion of Duke Energy into the council. Representatives from the local government and local irrigators, however, refuse to accept this proposition to defend their future access to water. The opposing views and understandings of water, have left negotiators struggling to arrive at a satisfactory solution.

The understanding of environmental governance as a form of political participation is based on the analysis of the changes in the ways in which social actors change relate to each other. This particular view brings to light the politics behind this transition to then evaluate how politically equitable are these changes. As Bridge and Perreault rightly explain, the move from government to governance is changing the relationships "via the language and models of partnership, participatory development, and stakeholder participation... [Subverting] old administrative, governmental hierarchies of ruler and ruled… and suggest[ing] an equality of agency among political actors" (2009, p. 482). In this regard, critical geographers have paid close attention to 'transition management' to emphasize stakeholder participation as a political process (Shove & Walker, 2007; Swyngedouw, 2007). They question who participates and who does not, whose voice gets heard, and ultimately who can be recognized as having political agency (Bridge & Perreault, 2009). Scholars studying the governance of water have emphasized the ways in which stakeholder power relations have proven a determinant factor in shaping governance institutions, structures and processes– including integrated water resources management (Cohen & Davidson, 2011) water privatization (Bakker, 2003; Budds, 2004), water technologies (Carey, French, & O'Brien, 2012; Jasanoff, 2003), social struggles (Perreault, 2005).

Before moving to the next section, in which I explore the ways in which water governance, water management, and water vulnerability interact with each other, it is important to highlight the distinction between water management and water governance. I understand water

governance as a concept that concerns organizational structures, institutional arrangements, and decision-making processes. Most importantly, I recognize the configuration of water governance as an inherently political process; a process that by giving increasing participation and influence to non-state actors, facilitates use, distribution, and regulation regimes that favor market-based interests and practices. Water management, in contrast, refers to one of the many ways in which water governance becomes materialized. It is the activity of planning, developing, and distributing the resource for its use.

A Water Governance and Vulnerability Nexus in a Conflictive Environment

As explained above, this analysis is based on the understanding of water governance and vulnerability as co-produced. I recognize this two-way relationship as enabled through the construction of the drainage tunnel and the installation of floodgates in lake Parón. Additionally, I view water management as a key component of this relationship: I understand water management as the material expression of this relation. The lake's water is managed not only for downstream water use, but also for risk mitigation. Hence, through water management, the effects of the politics behind PL's water governance on the resident's vulnerability are manifested. Similarly, the effects of perceptions of PL resident's vulnerability on governance discussions become materialized through water management.

Borrowing from Budds and Hinojosa's framework of analysis (2012), I recognize the relationship between water governance and vulnerability in the PL watershed as embodied in, and expressed by, a range of 'moments' (or instances) that have affected, or have been affected by, the ways in which water is being managed. I explore these 'moments': water flows and management, institutions, discourses, and - given the particularities of Parón - negotiations.

Water Flows and Management

The flow of water (its cycles and volumes) running from lake Parón downstream has varied significantly in the past few decades.[75] In this section, I will illuminate how these variations have been partially determined by the politics behind the conflict and the consequential transformations of the lake's water governance body, while shaping vulnerability fluctuations of PL water users and residents.[76]

Residents living near Lake Parón have long faced a serious risk of outburst flood.[77] Before the drainage tunnel was constructed in the late 1960s, the lake's water release mechanism consisted of infiltration through the moraine, causing it to be unstable (Personal communication, engineer and former employee of Duke Energy, June 10, 2010). Even though the flow of water was limited in comparison to what it is today, according to interviews, it provided sufficient water for the majority of all user groups.[78] Hence, during this time, before anyone could control the lake's water flow, the extent to which locals were vulnerable was driven by their risk of exposure to GLOF. To a lesser extent the vulnerability of irrigators was determined by location. Vulnerability is not experienced uniformly throughout PL watershed. In this case, location plays a key role in shaping differential vulnerability throughout the watershed. While those users located further from the stream have a less secure access to water, those who live near the flood path areas experience a heightened risk of disaster exposure.[79]

The introduction of technology changed PL's landscape of vulnerability drastically.

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[75] For specific information on flow variations refer to Chapter Three.

[76] By changing vulnerability, I do not necessarily imply that vulnerability as a whole increased or decreased, but rather that the driving factors and the intensity with which they contribute to PL resident vulnerability have shifted.

[77] Scientists identified a risk of outburst flood in the area as far back as 1940 (Carey, French, & O'Brien, 2012). For more details on this topic refer to Chapter One.

[78] Back then, and even today - that there is abundant water available – due to the distribution system and infrastructure, those water users who are at the end of the canal do not enjoy a secure access to water, as they are either obliged to irrigate at night time, when no one else is using the water, or simply do not access water (Personal communication, irrigator and community leader, August 11, 2011).

[79] The main determinants for water distribution among irrigators in PL are location and land area. The water flowing from the Parón-Llullán stream is distributed into several canals (some of which are paved). Sometimes these canals extend for over a kilometer and provide water to over 1,000 irrigators. Those who are closer to the main stream have access to the water first letting their downstream neighbors access the water after they are finished. The duration of time at which they are allowed to re-direct the water flow to their property depends on the planted acreage.

Being able to control the lake's water flows allowed the government to mitigate the long-existent latent risk of outburst flood. However, once the government began combining its disaster prevention agenda with interests of hydroelectric generation (Carey, 2008), PL irrigators were bound to become vulnerable through the politicization of their water source. Interviews suggest that this disaster management approach did not become much of a problem until the 1990s, when a series of privatizations drastically changed the country's environmental governance. In 1996, when the government privatized downstream hydroelectric Cañón del Pato, control over lake Parón's drainage system moved to private hands.[80] This governance change appeared beneficial for watershed's residents at first sight. The company would be better able to operate, maintain and repair the lake's drainage infrastructure. In addition, their water use did not contradict the already-established safety requirements. However, the introduction of this new stakeholder proved disastrous to the local water user groups. While this new arrangement stabilized environmental factors driving water vulnerability, the social aspects were significantly aggravated.

Water flow's cycles changed drastically, and local user groups lacked a voice and access to information regarding the rate and timing for these changes. Since their water use was opposite to the company's, these changes in water flow made their access to water vulnerable.[81] According to locals, while most often the company set flow rates too low – making it difficult to sustain crops - occasionally they released too much water, causing erosion, ruining the irrigation canals, flooding the fields, and damaging the quality of drinking water. The variability of the volume flow rate and the unpredictability of timing with at which its volume would change rendered water users and their lifeway vulnerable. It was particularly the lack of reliable access

[80] For more details refer to Chapter Three.
[81] See page 51 to revisit the contradictions between the company's and the community's water use.

to water that had more serious effect on local populations since, for the most part, their livelihoods are intimately tied to their use and access to water.[82]

For almost ten years, water flows reflected only the needs of Duke Energy, making local residents and user groups vulnerable in an almost unchanging way. The inability to control, or to have a voice as to the water flow, which translated into a lack of secure access to water, prevailed as the major factor influencing vulnerability throughout the PL watershed. Once again, in July 2008, the landscape of vulnerability changed drastically along with the management of water. Tired of being institutionally silenced and of resisting water discharges that damaged their livelihoods, locals organized themselves, took the lake by force, and since then have managed the water and controlled its flow according to their own needs.[83] Interestingly, ever since they started managing the lake's water, those in charge have paid especial attention to water flow rates, ensuring that not a single drop of lake Parón's water is used by Duke Energy;[84] in a way, using water flow as a tool to make the company's access to water vulnerable, and to show that it is the community who has the power now.

This new governance arrangement caused significant changes in the vulnerability landscape because Parón's water was now managed very differently. The new water management plan secured a distribution system and flow rate that not only protected the

[82] The effects of an unreliable access to water are felt differently by all user groups. While Duke's water management regime rendered residents of Caráz vulnerable by affecting the quality of potable water, the effects of the company's water use were more severe for Campiña and Cruz de Mayo. Almost all Campiña residents rely heavily on water for their livelihoods as they live from agriculture, thus the then newly implemented water governance arrangement had a serious effect on their livelihoods, forcing many of them to migrate to Caráz in search for a new livelihood source (Personal communication, local farmer, June 14, 2010). Overall, however, Cruz de Mayo was the most affected by Duke's water management regime, not only was their livelihood source endangered for the same reasons as Campiña, but also as their community is located in such a remote area, and as they have poor access to education, it is practically impossible to diversify their livelihood strategies.

[83] According to community leaders, it is through a joint effort that different user groups are managing the lake. While - given the remoteness and rough living conditions nearby the lake - they have always relied on someone from Cruz de Mayo to operate the infrastructure, decisions regarding how much water to release and when to do it are made by representatives from the different user groups.

[84] Glaciología - the one government agency that is still in good terms with the community – in their aim to ensure a safe management of water, has taught representatives from local irrigator groups how to measure the lake's water surface level, and its stream's volumetric flow rates. Since there are two streams of water flowing from the glaciers to the Santa River - being Lake Parón the head source of one of them – representatives ensure that the water flow entering the Santa river is no higher than the second stream's flow (field notes, 2011).

community's access to water, but also increased the risk of an outburst flood because those who control the lake's water were only concerned with water use and distribution. The immediate need to secure the community's access to water, and to demonstrate their power (over the government and the hydroelectric company) appeared to have eclipsed concerns over preventing an outburst flood. The volume of water flowing from the lake was significantly reduced, and safety standards could no longer be met. The more time went by, the more the lake's water level rose, and the more unstable the moraine became. Despite repeated warnings from the government, community members and leaders refused to change their management scheme. After all, it was through government concerns over security and risk mitigation that their access to water and their voice as users were taken away in the first place. Only after numerous negotiations did community leaders agree to let a few, selected, government representatives collaborate with them on developing a safe water management scheme. Even though they jointly decided for how long, and when to release a higher, or lower, flow rate, the final word rested with the community.

Ever since this collaboration between the government and local user groups began, fluctuations in the landscape of vulnerability have been closely tied to conflict negotiations. The extent to which the government-community collaboration is successful depends on the precarious relationship between the water authority and the community. The water flow has become more politicized than ever before. While it appears that to community users water flow has become a tool to demonstrate power, it seems like to the government it represents the only way through which the risk of GLOF could be mitigated. The extent to which the community's water vulnerability is driven by the risk of GLOF or access to water depends directly on the water flow, and this flow in turn depends on the interests of those who are in control.

TECHNOLOGY

After experiencing a few disastrous outburst floods in the Cordillera Blanca during the 1950's,[85] experts rushed to survey and classify the lakes in the area (Carey, French, & O'Brien, 2012). Pressured by the public and in the midst of a heated debate over the actual existence of a risk, the government embarked on 'lake security projects' that consisted of damming and partially draining the region's most unstable lakes (Carey, 2010). As the largest lake in the Cordillera Blanca, and one that had been qualified in the past as a provoking a "situation of incessant danger" (Carey, 2010, p. 89), Parón was one of the lakes where the project was implemented and where technology was applied to mitigate the imminent risk of GLOF.

As previously stated, with the introduction of hydroelectric technology to the lake, a direct link between lake Parón's social and natural water dynamics was created. The drainage tunnel and floodgates enabled a strong connection between water governance and water vulnerability. In what follows of this section, I will elaborate on the nature of this two-way relationship and on the role of technology in mediating it. First, I explore the effects of water vulnerability on water governance, especially focusing on the key role that perception plays in shaping this relationship. Second, I study the ways in which water governance affects water vulnerability, emphasizing the role of politics in shaping vulnerability transformations.

Water Vulnerability affecting Water Governance

After the constant occurrence of glacier disasters in 1941, residents developed deep knowledge of Cordillera Blanca natural hazards (Carey, 2008). As societal anxiety developed and grew with repeated natural disasters, people began to demand that the central government protect them from GLOFs. Even local authorities pleaded with the national government to be

[85] In 1942, neighboring glacial Lake Palcacocha provoked a GLOF that took almost 5,000 lives in nearby Huaráz. In 1945 and 1950, two additional outburst floods killed 700 people and almost destroyed downstream Cañón del Pato.

more aggressive in protecting their communities from glacial lake disasters. In 1942, municipal leaders from Caráz demanded disaster mitigation work at Lake Parón (Carey,2008). In 1951, engineers determined that the lake's sudden swelling was caused by a flood at Artesoncocha, a lake three kilometers above Parón. Downstream populations were at the brink of disaster, which compelled 300 Caráz residents, accompanied by the local authorities and the local priest to hike 30 kilometers to Lake Parón to take the patron saint of Caráz to the lake's shore and pray for the community's population (Carey, 2008). After repeated public demands disaster mitigation technology was introduced to lake Parón in 1968 (Carey, French, & O'Brien, 2012). It was not until 1985 that its construction was finalized, and the lake's threat of a GLOF was reduced when the government took charge of the lake's water management and lowered the lake by 45 meters (Carey, French, & O'Brien, 2012).

As time passed, the lake's drainage technology began being used to prevent disasters and to support hydroelectric generation. As a result, locals found themselves being unable to satisfy urgent needs – such as having a reliable access to water. According to the government and hydroelectric company, Parón's waters were being managed to prevent disasters and allocate water among users; to local irrigators the lake's management took away their access to a critical resource. Fieldwork suggests that during this time, the local perception of PL's water vulnerability changed considerably. While they still acknowledged the presence of the risk of glacial disasters, locals began perceiving that their 'vulnerability to GLOFs' was being used as a tool to take away their water rights.

Driven by their conviction to defend their water rights, and ignoring the disaster management implications of their actions, locals seized the lake and created a transitional governance body. Once in power, representatives assured local access to water. However, since

they acknowledged that addressing Lake Parón's disaster prevention issues required more resources than they had available, they requested the formation of a multi-stakeholder governance body (Untiveros, 2010). Unfortunately the stakeholders could not arrive at a consensus during negotiations and this governance body is yet to be created. Interviews suggest that this new governance arrangement will only be realized if locals perceive that it will secure their interests and reduce their water vulnerability.

New Vulnerability Landscape

While technology decreased the risk of glacial disasters, it also introduced a whole new set of factors driving social vulnerability that would prove to be central in shaping ongoing water vulnerability. First, the sole presence of technology in the watershed instantly created unequal power relations among stakeholders. Similar other geographers, I recognize the power that the water infrastructure has over the life of the watershed's residents (Giglioli & Swyngedouw, 2008; Loftus, 2006; Mehta, 2007; Sultana, 2013). By generating a sharp division between those stakeholders who are able to control the infrastructure and those who are not, the use of technology generated a socially unequal environment. Only a few stakeholders were able to operate the infrastructure, and with this regulate the day to day activities of other water user groups. Second, as a consequence of these unequal power relations among water user groups in the watershed, and given their disparate needs and uses of the resource, the struggle to control the resource rose to the surface.

By default, the responsibility to control the lake was initially assumed by the government. Taking into account the needs of downstream water users, government experts released water to meet the established security requirements. Although during this time, local users still had secure access to the resource, their water vulnerability was mainly driven by how the system under

which they lived disconnected them from the water flow. With this governance arrangement, they did not have a voice in the decision-making process, and had limited access to information regarding how and why decisions were made.

In 1996, when the government privatized the downstream hydroelectric plant Cañón del Pato, control over lake Parón's drainage system moved to private hands.[86] This private entity was a promising new actor because it had the expertise and capital to use and maintain the infrastructure. However, this transaction made evident that the lake's water management was now directed towards reinforcing a regime of accumulation, a regime that proved disastrous to other stakeholder groups. By allowing this new actor to hold such power, and by not considering other stakeholders, the new governance arrangement completely destabilized the local water politics.

While this new governance arrangement maintained the environmental drivers of water vulnerability under control, social drivers were significantly aggravated. Local water users were rendered vulnerable because they were systematically silenced and had no access to information regarding the rate and timing for volume flow changes. When information was made available, it was provided with insufficient time in advance to be prepared; As a result, because their water use – the timing, duration, and quantity of water flow variation required - was significantly different from the company's, their access to water, and their livelihoods, were adversely affected.

After the Lake was seized in 2008, and locals began controlling the lake's water, the proper use and maintenance of the drainage technology became a concern for the security of all nearby residents. As mentioned earlier, the introduction of technology created a sharp division between those users who are able to safely manage and maintain the infrastructure, and those who are not.

[86] For more details refer to Chapter Three.

Because it was the latter group who seized the lake and took over the responsibility of controlling the infrastructure, authorities in Huaráz and Lima were quick to bring up the risk implications of this new struggled-over governance arrangement. The lack of expertise and capital for the infrastructure's maintenance were the main causes of concern.

Once negotiations began, risk concerns came to the fore. Negotiating parties realized the immediate need to have a trained person operating the infrastructure, and more importantly, the urgency to come up with the funds necessary to pay for infrastructure maintenance. This problem was clearly explained during a conversation I held with a Caráz engineer:

> "[Water] users are disoriented; they don't have access to training for managing lake Parón. They need to learn about the lake's operation … [for this] one needs to know how the mechanics and electrical system [of the infrastructure] work, and even the natural processes of de-glaciation and rainfall. Taking into account all of these parameters is that one needs to operate the floodgates… Training is necessary, and it's not being done! ... Those who are managing the lake's waters have not been trained. They have only seen how the State's operator uses the machinery, what buttons he's pushing and when, but they don't know anything about electrical circuits, how the pressure pumps or floodgates work!" (Personal communication, engineer and former Duke Energy employee, June 10, 2010)

Even though these issues were repeatedly discussed in the negotiation process, given that the conflict's outcome had placed the lake's water governance in such a precarious situation, none of these issues could be addressed properly. On one hand, Glaciología agreed to conduct training and supervise operators; however, given the seclusion and harsh living conditions in the lake's security post, it was always someone from Cruz de Mayo who was assigned this responsibility. As indicated in the previous quotation, these responsibilities require deep mechanical and

electrical knowledge about the machinery. It is unlikely that the lake's operator will have sufficient knowledge to prevent a disaster with only a few training sessions. On another hand, negotiators never found a solution to the lake drainage infrastructure's maintenance problem. While local water user groups were divided as to their willingness to contribute financially towards this cause, the local government, ANA, and regional government, were unable to compromise and agree on who should contribute and how much (field notes, 2011). Based on the uniqueness of this water management conundrum, where the resource's control mediates its use and mitigates risk, it was difficult to pinpoint the responsibilities of each entity. In the end, nothing was done about it. In a context where this is only one of many issues to be negotiated, and where negotiations are continuously interrupted by the precariousness of the negotiating parties' relationships, it is unlikely that these problems will be addressed anytime soon.

In light of these considerations, I argue that the introduction of technology created a new set of social relations that reinforced social vulnerability upon local water users (White & Wilbert, 2009). Because of these relations, today, local user groups, protecting their water rights, find themselves facing responsibilities that they were unprepared for. Since this technology was designed for a very different type of user than the ones actually controlling it, its poor operation and maintenance once again changed the landscape of vulnerability, making the risk of GLOF the most important factor influencing water vulnerability in the watershed.

The appearance of these social drivers to the vulnerability equation of Parón occurred not because of the introduction of technology per-se, but because of the close connection between water governance and vulnerability that the use of this technology generated. The lake's water control opened up the possibility to be used as a tool to defend particular interests. Hence, ever since the construction of the drainage tunnel, the intensity with which the risk of GLOF affects

water vulnerability has become closely tied to the political stability of the local water governance.

DISCOURSE

The relationship between vulnerability and water governance in Peru and in PL is both material and discursive. Their discursive relationship can be appreciated in discussions at multiple scales of analysis. For instance, as explored in Chapter Two, international debates about vulnerability to climate change and water scarcity have shaped the formation and structure of water governance frameworks (i.e. de-centralized, participatory, and based on the watershed unit). The aim for (economically) effective uses of water has informed rules and regulations that have in turn created a new rationality for water management. Since this rationale is not in accordance with the Andean conceptualization of the value of water, it has prompted a clash of interests and discussions over water use throughout the Peruvian Andes (including Parón), placing Andean livelihoods - such as Cruz de Mayo and Campiña - in a vulnerable situation.

At the watershed level in PL, the discursive relationship between water governance and vulnerability has been transforming with time. In the mid to late 1900s, policy approaches towards disaster management were guided by engineering advances and scientific understanding of glacial lake dynamics (Fernandez Concha, 1957). This purely technocratic understanding of disaster management in the country shaped PL residents' views of how to prevent GLOF disasters. They believed that risk mitigation was accomplished by constructing a security dam that was controlled by an expert (Carey, 2008). Once the infrastructure was built, implicitly, the lake's management brought up a question that lingered in the back of all downstream water users' minds: *what is the lake's water management purpose?* Shifting views and answers to this question have shaped the ongoing discursive relationship between water governance and vulnerability. According to interviews, during the early years after the security wall was built,

downstream residents largely agreed on the need to manage the lake's water to prevent a disaster, and having 'experts' in the governance body. Once the dam was privatized and irrigator's access to water was being adversely affected, stakeholders' understandings of the lake's management purpose began diverging. While some argued that the infrastructure's use should be directed toward disaster prevention, others defended their purpose for agricultural development. Still others advocated for hydroelectric generation. Since then, stakeholders have continuously debated the lake's management purpose (agriculture, hydroelectric generation, disaster mitigation, tourism development), and with this discussions the meaning given to the lake's water continues to shift.

These perceptions have material effects that influence the formation of governance arrangements. This was the case in 2011. The direction of the conflict's discussions at the time indicated that agriculture and disaster mitigation were the main management purposes disputed. This debate generated spinoff discourses that then affected the formation of a governance body. For instance, the previously-discussed slogan *prefiero morir de una avalancha que de sed*, or "I would rather die from an avalanche than of thirst", hints to how the lake's management purpose towards risks prevention is likely perceived as contradictory to its management for securing agricultural needs. Since the community's priority is to defend access to water, rather than mitigating the risk of GLOFs, this perception, I argue, has shaped negotiations, hindering the formation of a new governance body.

INSTITUTIONS

Parón represents a unique case that, in a way, lies outside the issues covered by the legislation. Even though the regulation of the Water Resources Law, approved in 2010,[87] mandates the inclusion of risk mitigation actions in the watershed's management plan, it fails to

[87] DS No 001-2010-AG

provide many details that in the case of Parón are vital for the conflict negotiations to move forward.[88] The lack of information regarding the financing of mitigation efforts, places PL in a tenuous situation. Since stakeholders are unable to secure the much needed financial support for the infrastructure's operation and maintenance, it heightens PL residents' vulnerability to glacial disasters. In fact, the problem becomes much more serious if Parón's security dam is indeed categorized as a 'hydraulic infrastructure'. According to the code's section on operation of hydraulic infrastructure, users are responsible for the financial costs of operation and maintenance of the infrastructure.[89] Since stakeholders repeatedly discussed this issue during the conflict negotiations, the users and state institutions are aware that this option is not viable. To this day, it remains to be seen how this specific aspect of the conflict's negotiation will result. Fieldwork suggests that given this legal loophole (1) the government will likely avoid taking responsibility to maintain the infrastructure, and ultimately to secure PL's resident's safety; and (2) ANA will likely use the law to re-introduce Duke Energy to the governance body of Parón. Reinserting Duke into the watershed's governance body would be a quick fix to this problem; however, the social consequences in PL would be catastrophic.

The role that laws, rules, and regulations have played throughout the conflict is strongly influenced by the degree to which state agencies have unanimous positions. For example, the Constitutional Court (CC) and executive branch have not only contradicted, but challenged each other, affecting the credibility of the state, hampering the formation of a new governance body, and making water users more vulnerable. After Duke Energy requested that the CC evaluate the case and reinstate the company's rights to lake Parón's waters, the CC published a resolution that

[88] The only reference to a water-related disaster mitigation effort is mentioned in Chapter Two, Article 264, of code No 29338, which assigns the responsibility to elaborate a plan to control and mitigate GLOFs is assigned to ANA and the regional representative of Civil Defense Institute (government institution in charge of disaster prevention).

[89] According to Title 4, Chapter Four, Article 187, of code No 29338, 'the fee for the utilization of large hydraulic infrastructure is the payment that water users ... make to cover the costs of services for operation and maintenance, and for the operator's investment on building such infrastructure' (author's translation).

demanded the reinstatement of Duke's water license. The resolution mandated that ANA evict the community from the lake, and that it return the lake's infrastructure to Duke Energy.[90] The impact of this resolution was so drastic not only because of the severe measures it imposed, but also because of when it was published. This resolution became public while local user groups, Caráz' municipality, ANA, ALA, Glaciología, PNH, and the Regional Government were negotiating the formation of a new governance body, and more importantly, when Glaciología was beginning to succeed at gaining local trust by supervising the lake's infrastructure management. As a result, by placing ANA – and consequentially ALA and Glaciología - in a position of confrontation with Parón's water users, it caused all negotiations to freeze. In addition to excluding Glaciología from the lake's management decision-making process, the resolution stopped all prospects of implementing the new water resources law, and creating a new governance body. Furthermore, it appears that the effect of this resolution has been opposite to its original intention. Rather than securing Egenor's water rights, they have been rendered more vulnerable. According to interviews, neither the government nor Duke Energy will use force to enter the lake, and local user groups appear prepared to defend the lake against "whatever comes" (Personal communication, local government representative, August 11, 2011).

The study of institutions in Parón, throughout the conflict, illuminates the ways in which politics mediate the relationship between water governance and vulnerability. Institutions are being used to secure the interest of some at the expense of others. The ambiguity in the 2009 Water Resources Law is being used as a tool to (1) negotiate the re-entry of Duke Energy into the watershed's governance body, and (2) free the government from having to face the financial costs that mitigating the risk of a glacial disaster implies. In addition, the analysis of institutions

[90] This refers to resolution No 093-2007-AACH, which was created by the *Autoridad Autónoma de Cuenca Hidrográfica del Santa,* or Autonomous Authority of the Santa River Basin (a regional organization in charge of the use and conservation of water and soil in the Santa watershed that was dissolved in 2008). For more information see Chapter Three.

reveals how role of institutions affecting vulnerability is clearly shaped by the ways in which these are being used. In this case, the government's inter-agency lack of communication, which sent contradictory messages, hampered peace efforts ultimately rendering both Duke Energy and the community more vulnerable.

NEGOTIATIONS

Water governance and vulnerability have changed according to proceedings of the conflict's negotiation. Throughout this process, while some factors affecting vulnerability have become more important in influencing local water vulnerability, others have become less so. Negotiations have affected both the structure of the lake's transitional governance body and the prospects of the formation of a new water governance arrangement. Scholars studying conflict resolution emphasize the importance of a negotiation process in determining the outcome of disputes (Kriesberg & Dayton, 2011). Aspects of Parón's negotiation - who participates and who does not? Who facilitates and leads meetings? Where do they take place? Do the topics discussed represent all stakeholders' concerns? Do negotiators really represent their people? are important for the outcome (in this case, a water governance body) and how it determines changes in the landscape of vulnerability.

Conflict negotiations began taking place shortly after the lake was seized in 2008. Initially these negotiations occurred in Lima. At first they were oriented towards briefing high public officials about the conflict; afterwards the topics discussed shifted to the modification of the contemporary governance body and implementation of new arrangements (Untiveros, 2010). In fact, in a meeting in Lima just a few months after the lake was seized, Duke Energy proposed devolving the lake's management to a mixed commission to be lead by INRENA, and with possible participation of the local user-groups (Defensoría del Pueblo, 2009a). However, even though these included representatives from organizations such as the Ministry of Energy and

Mines, the Ministry of the Environment, congressmen from Ancash, and Duke Energy, they did not include local water users (Untiveros, 2010). Once again, a governance body was being negotiated and PL water users were excluded from the decision-making process.

Even when negotiations moved to Caráz, took place at a relatively neutral location (Caráz's Municipality), and began to include local water users, the meetings have always been under the responsibility of the government. It has always been the Water Authority that called for meetings and facilitated them. While according to interviews with negotiators, it appears that the topics discussed were of interest to all stakeholders; having the government lead discussions was problematic. As I was told during an interview "The users should be the ones directing the meetings and not the state. They should call for meetings, and think about the meeting's agenda, rather than just accepting what's being proposed to them. The users should direct meetings and have more responsibilities… the participatory aspect of the water law would work better if it had a social focus. Experts should yield responsibility to small farmers" (Personal communication, local public servant, August 2, 2011).

As previously mentioned, addressing risk prevention has been a major concern for government agencies such as ANA and Glaciología; thus, the safe management of the lake's waters was among the main topics of discussion. Particularly, negotiators arrived at a consensus regarding the appropriate water level for the lake and Glaciología's role supervising its management.[91] However, not all discussions around disaster prevention have been resolved. The maintenance of the lake's infrastructure has been a very complex topic to address. It is of vital importance to reduce PL resident's vulnerability to GLOF; however, given the way in which 'risk management' has been used in the past to secure the interests of some, and how it is likely to be used to re-insert Duke Energy into the PL's water governance body, it is unclear how the

[91] For more on this particular negotiation refer to Chapter Three.

outcome of this discussion will affect the local water vulnerability.[92] On the one hand, the vulnerability to GLOFs would unquestionably be reduced. On the other hand, the likely insertion of Duke Energy into the watershed's governance body could (1) once again make the local access to water vulnerable, and (2) drive the local water users apart from the decision-making process and from information regarding the lake's water management.

CONCLUSION

Parón is a unique case because of the specific context under which the conflict began and escalated. This conflict was driven by the struggle for access to the resource, and shaped by the politics of disaster management. This unique characteristic provides a rich case study to explore the ways in which water governance and vulnerability are interrelated. My ultimate goal was to uncover this link.

Before examining this relationship, I introduced the intellectual approach I used for my analysis. I relied on political ecology because the critical concepts, methods, and theories from this tradition are suitable to uncover the complex relation involved. Subsequently, I provided a brief review of political ecology research on water governance and vulnerability. I used this review to then explain the way in which I conceptualize both terms. Finally, I examined the relationship between water governance and vulnerability. Specifically, I explained the effects of changing water governance bodies on the landscape of vulnerability, and how views and perceptions of vulnerability have affected the formation and change of governance arrangements. In particular, I illustrated this relationship by exploring specific 'moments' or instances that have affected PL before and throughout the conflict: water flows and management, technology, institutions, discourses, and negotiations.

[92] For more information on how disaster mitigation is being used to re-introduce Duke Energy to the lake's governance body refer to the institutions section.

By closely examining these ‘moments’, I was able to unpack the specific aspects of the governance-vulnerability relationship and to demonstrate the central role that water management plays in mediating this relationship. In my analysis, I understood water management as the fundamental connection between water governance and vulnerability. For instance, before it was possible to manage the lake, the local vulnerability to glacial disasters had been historically driven by the risk of GLOF. Ever since the lake was seized, the local water vulnerability - specifically driven by the risk of GLOF - has been either aggravated or diminished depending on the lake’s water surface level that resulted from a specific management regime.

While management lies on the surface, buried underneath is the *politics* of water management. In an agitated political environment, such as PL became after the conflict erupted, water management has been driven by the local water politics. Hence, the effects of politics on the vulnerability-governance relationship have been tremendous. On one hand, overall, politics appears to have aggravated water vulnerability of all stakeholders. These effects vary largely by user group though. Aspects such as reliance on technology, discourses, and institutions seem to have benefited the interests of some at the expense of others. On the other hand, the formation of governance arrangements, as an inherently political process, has mediated the use, management, and regulation of the resource favoring particular interests and practices while rendering others vulnerable.

The influential role of politics in shaping the relation between water governance and vulnerability would not be possible if technology had not been introduced to the watershed in the first place. It is precisely the introduction of this technology to PL that enabled such a direct link between water governance and vulnerability. By allowing a party to control the main water source in PL, it was also given the power to regulate the daily life of other water users (Loftus,

2006). Stakeholder vulnerability, in addition to being driven by the risk of a glacial disaster, began to be induced by social drivers. Since then, the social relations in the watershed have been profoundly changed, and since water users began struggling and competing for the resource, vulnerability has become becoming more dynamic than ever.

Results from uncovering this relationship support critical views of technocratic approaches towards disaster management. The Parón case study shows how approaching disasters simply as physical phenomena, rather than mitigating risks, can exacerbate them. With the insertion of drainage technology to PL, vulnerability has become more dynamic, obscure, and unpredictable than ever before. The vulnerability of PL water users and residents' has transformed to be driven by water governance decisions that are constantly changing. Also, since the politics behind the conflict caused the number of stakeholders affecting negotiations to increase, water management decisions have become unpredictable, and even secretive. Interviews indicate that Campiña irrigators were not kept well informed of negotiations, and that they were not even aware of how Parón's water was being managed. With this in mind, it would be fair to argue that the vulnerability that PL water users experience has heightened because it has transformed to be multifaceted, more complicated, and unpredictable than it was before.

The examination of the links between water governance and vulnerability also bring to light an important uncertainty regarding the role of the government in this conflict. As previously mentioned, once the lake's infrastructure was privatized, it became unclear what the purpose of the lake's water management was. While for some it was risk mitigation, for others it was hydroelectric generation, yet for others it was irrigation. This particular uncertainty is quite important because, it allows the government to deal with this governance issue by solely following the 2009 Water Resources Law. According to its legal code, the financial

responsibility for the water infrastructure should be borne by water users. However, the Parón case is unique. Ironically, while government agencies such as ANA and ALA are precisely the strongest advocates for managing Parón's waters according to risk and vulnerability considerations, they also shy away from their role having to protect citizens from disasters. Further research must more fully explore and problematize the role of the government during this conflict.

CHAPTER 5
WATER AND POLITICS: A CONCLUSION

In July 2008 irrigators from the different communities in PL joined forces to recover their secure access to water and to defend their livelihoods. As a primarily agricultural area, the livelihoods of most community members at Campiña and Cruz de Mayo depend on having a reliable access to water (Lynch, 2012). Irrigators seized the lake after having to endure Duke Energy's water management regime for over sixteen years. During this time, residents and irrigators in PL have been deprived of a reliable access to water. But the Parón water conflict has grown to represent more than a struggle for access to water. With this conflict it is both access to water and the production of vulnerability to disasters that are being negotiated.

The water problem in Parón rose to the surface when Cañon del Pato hydroelectric plant moved to private hands; however, it began long before. The problem dates back to the time when the government began damming and draining lake Parón. It is precisely the possibility to control Parón's water that initiated this conundrum. The damming of the lake, and addition of hydroelectric infrastructure to it, are key moments to this study because they introduced a new set of actors and interests to the watershed, and in doing so, presented this area with a new set of social relationships. Since then, water politics became a reality in day to day life in Parón, a reality that has been transforming ever since. Throughout time, the forms and intensity with which water politics have been manifested in Parón, have been evolving. Today, water politics in Parón is shaped by two main discourses: disaster management and access to water.

In this thesis I explored the political environment of water in Parón. I analyzed the ways in which vulnerability to disasters and access to water have shaped conversations about water management. Even though I acknowledge water management as an important component of my analysis, I expand my assessment to encompass the broader dynamics that comprise the study of

water governance. I examined the ways in which organizational structures, institutional arrangements (2009 Water Resources Law), and decision-making processes (IWRM, decentralization) shape the access, use, management, and regulation of water in conflictive Parón. Furthermore, I reviewed water governance in relation to vulnerability. Specifically, I analyzed the ways in which water governance and vulnerability in Parón are interrelated. In what follows, I will review the arguments presented in this thesis.

REVIEW

In Chapter Two, I situate the reader in the environmental, historical, economic, and cultural settings of Peru. Particularly, I focus on the department of Ancash and the city of Caráz. For a better understanding of the Parón conflict, in addition to providing an empirical description of the contextual information, I had two main analytical objectives: to provide the reader with (a) sufficient information to understand Peru's water conundrum, and (b) a clear idea of Andean Ancash's landscape of vulnerability. For this, first, I have told the story of water stress in Peru. I introduced emerging water challenges such as climate change and the country's disparate geographies of water use, to then critically analyze the government's response to these threats. In particular, I focused on changes in the country's legal and institutional framework for water governance. Second, I have mapped Ancash's landscape of vulnerability. Through the introduction of the department's social and environmental landscapes, I have shown the study area's latent risk of exposure to natural disasters. Also I have provided a picture of resilience in Andean Ancash, by analyzing the access to social services and livelihood opportunities.

With a clear picture of the context in which the conflict emerged, Chapter Three provided an overview of the Parón conflict. Even though this chapter is mainly empirical, while mapping the conflict's progression, I elucidated the ways in which access to water is determined by

governance arrangements, and how these arrangements are in turn shaped by changing institutions, laws, and politics that benefit some users at the expense of others. I provided a detailed description of this conflict, to critically analyze, and illuminate the complications behind, environmental (water) governance. I demonstrated how water governance, as a process of political participation and inclusion, does not necessarily have implications for "justice, rights, and distribution" (Bridge & Perreault, 2009, p. 482). I showed how, by encouraging the participation of multiple non-state actors, water governance facilitates the negotiation of different representations of the environment (water management for stakeholder use vs. water management for risk mitigation), ultimately politicizing its management and reinforcing a regime of accumulation. In this assessment, it was also my intention to problematize the conflict's negotiation process by pointing to transparency, leadership, and representation issues. The resource's heavy politicization became a challenge that ultimately weakened institutional processes, inter-group communication, and parties' negotiating room, making a mutually beneficial outcome more difficult.

In addition to water distribution, the management of lake Parón's waters is key for the mitigation of the risk of an outburst flood. Hence, with this conflict, it is both access to water and vulnerability to disasters that are being negotiated. In Chapter Four, I turned from critically analyzing water governance to examining how it relates to vulnerability. Conceptualizing this relationship as mutually causal, interactive, and dialectical, I explored how water regulation and management decisions channel the effects of water governance on vulnerability, but also how discursive conceptualizations of vulnerability shape the determination of governance structures. For this, I explored a range of moments or instances - water flows and management, technology, institutions, discourses, and negotiations – that I recognized as embodying this relationship. I

argued that a new, more convoluted, form of water politics – introduced to the watershed with hydropower technology – have created a new set of social relations that reinforce social vulnerability upon local water users, producing a transformation in vulnerability. Vulnerability, I argue, became more complicated, unpredictable, and multifaceted than ever before. Furthermore, recognizing institutions as being shaped by politics, I argued that their effect on vulnerability varies according to the user group. Similarly, as I viewed this relationship as material and discursive, I argued that discursive understandings of 'the lake's proper management' have shaped the formation of governance bodies, in turn favoring the interests (and reducing the vulnerability) of some stakeholders at the expense of others.

WATER GOVERNANCE AND VULNERABILITY: CONTRIBUTIONS FROM THE CONFLICT IN PARÓN

Throughout this thesis I have discussed the complications behind water governance and the implementation of a governance framework. Furthermore, recognizing the configuration of a governance framework as an inherently political process, I acknowledged the ways in which they can have profound effects on broader aspects of water users lives. As such, I studied how water governance – the configuration of a governance body, the implementation of institutional arrangements, and the decision making processes and practices of given organizational structures – affects and is affected by vulnerability. Given the main findings in this thesis, I consider that important lessons can be drawn for both researchers and practitioners. In what follows of this chapter, first, I situate the main arguments in the literature and explain how they contribute to current debates. Second, I illustrate the importance of this thesis' findings to practitioners for an improved management of future disagreements over water use and distribution.

CONTRIBUTIONS TO RESEARCH IN GEOGRAPHY

The main arguments presented in this thesis pertain to both water governance and

vulnerability literature in geography. While Chapter Three brings to light the complications behind decisions, processes and results of water governance, Chapter Four better elucidates vulnerability. By providing such a close examination of the conflict's progression in Chapter Three, the arguments in this thesis support findings from previous studies on environmental (and water) governance in critical geography (Bakker, 2003; Bridge and Perreault, 2009; Budds, 2004; Budds & Hinojosa, 2012; Himley, 2008; Loftus, 2006; Perreault, 2005). In Chapter Three, I explore the governance of water in Parón. Similarly to other geographers, I argue that the configuration of water governance frameworks is an inherently political process (Himley, 2008). First, much like other geographers, by critically analyzing recent changes in Peru's legal and institutional water governance framework in Chapter Two, I elucidate how, to secure capital accumulation in the country, outside actors are re-framing discursive understandings of water as an economic good (Budds, 2004; Ioris, 2012; Loftus, 2006; Mehta, 2007). Second, by positioning the rescaling of water governance under neoliberalism and by examining decision making structures under the new legal framework, I contribute to previous findings that illuminate how decentralization and local participation do not necessarily result in local empowerment (Norman and Bakker, 2009). Third, in concurrence with Bridge and Perreault (2009), by closely examining the conflict negotiations and by analyzing each stakeholder, I illuminate how social relations (among state and private actors) shape environmental governance. Finally, in Chapter Four, by placing close attention to the effects of the introduction of drainage infrastructure and floodgates on the watershed's social relations, similar to Loftus (2006; see also Mehta, 2007; Sultana, 2013), I recognized this technology as embodying social power and as a tool to impose a regime of accumulation. All in all, it could be argued that the contestation and struggle for water in Parón – the involvement of actors at multiple scales, the

clash of interests, the emergence of disparate discourses, the decision-making processes and spaces for negotiation, the uncertainties and even the injustices - is a perfect example of how the reconfiguration of governance structures, processes, and institutions looks like on the ground. While this thesis contributes to water governance discussions in geography, it also furthers the study of vulnerability in geography.

Even though the objective of my analysis was not to theorize vulnerability, I consider that my analysis reinforces previous debates on how to conceptualize the term. First, the vulnerability analysis I conducted in Chapter Four supports an integrative framework that links both entitlements and risk-hazard approaches. Much like other geographers, I have used this framework to trace vulnerability from a specific instance of risk (Blaikie, 1985; Ribot, 2009; Watts & Bohle, 1993). Particularly, I limited my analysis to "water vulnerability" – a term I used to refer to the analysis of the lake's water management as an instance of risk. My analysis further validates the thoroughness of this model because it demonstrates how the use of "a multi-scale, multi-factor analysis of vulnerability" (Ribot, 2009, p. 6), elucidates the role and influence of multiple political forces.

Second, in addition to supporting the importance of the integrative framework of analysis, this study borrows from and reinforces previous conceptualizations of vulnerability. Firstly, much like other geographers have already done, by elucidating the differential effects water management decisions throughout the watershed, this study understands that outcomes of single events vary according to social structure (Blaikie et al., 1994; Watts, 1987). Secondly, by examining how people (water user groups) move into and out of vulnerable situations throughout the conflict, this thesis reinforces the understanding of vulnerability as a dynamic concept. Being concerned with vulnerable situations, rather than with "simple taxonomies… of vulnerable

groups" (Wisner et al., 2004, p.15) allows for a better and more precise understanding of the process that induced such a situation.

As geographers have already done, findings in this thesis challenge technocratic approaches towards disaster management (Cutter, 2006; Wisner et al., 2004). As I argue on the concluding arguments of Chapter Four, previous Peruvian disaster management approaches that were too reliant on technology, rather than mitigating a disaster in PL ended up further exacerbated resident's vulnerability. Similar to Loftus (2006; see also Carey, 2012; Mehta, 2007; Sultana, 2013) I problematized the use of technology illuminating the politics behind it. Recognizing that the struggle to control the water source in PL also affects the local water vulnerability, I argued that the introduction of drainage technology and floodgates have made vulnerability more dynamic, obscure, and unpredictable than ever before.

Practitioner Contributions

Findings from this study provide important lessons especially regarding water governance efforts. The water conflict in Parón is only one of many water conflicts to come in Peru. As the country faces a very serious risks of water shortage, as supply and demand grow more geographically uneven, and as the government begins to implement a governance framework that appears inequitable, it is likely that conflicts of this nature will continue to increase in number. Cases such as Parón illuminate challenges to approaches currently taken to handle disagreements over water use and distribution, and to the implementation of the new water governance framework. The identification of these weaknesses could be of help to re-direct these efforts as the government begins to face an increasing number of environmental conflicts, and continues to implement this new framework throughout the country.

In what follows of this section, setting aside scalar politics of water governance, I will

identify structural failures in the implementation efforts governance that hampered the conflict's de-escalation, and that could potentially contribute to ignite or aggravate future water conflicts. Particularly, I focus my analysis to the participatory or IWRM aspect of the law. First, while IWRM principles in the 2009 Water Resources Law promise to improve participation and representation of marginalized populations, fieldwork indicates that excessive centralization and top-down decision making still persists. Assigning ANA (central government) the authority to create and design water related policies while giving the responsibility to implement and regulate to the regional and local authorities appears to be causing drawbacks because, as scholars have already argued, regional and local representatives remain disconnected from wider political-economic processes (Oré et al., 2009). As a result, at least in Parón, it is still ANA who makes all decisions, which further discredits (1) ALA's authority and (2) the decentralization process, in the eyes of the local population. Fieldwork indicates that if there is no trust especially in the decentralization process, it is likely that the creation of a functional 'participatory' governance framework will never be successful because local stakeholder involvement will decrease, and negotiations over a water management plan would hardly yield results.

Second, while local representatives from the water authority now have the responsibility to implement and regulate the new water policy, fieldwork indicates that they do not have sufficient resources to match their responsibilities. In the case of Parón, this responsibility-funding mismatch has further deteriorated the relationship between ANA and the water user groups. Being limited by time and resource pressures has forced ALA to 'act fast' and to almost force water users to abide by and familiarize themselves to the new legislation without providing proper training on it. Naturally, this combination of what could be seen as persuasiveness and secrecy was received by water user groups with suspicion. Locals interpreted this effort as a plot

to change their water uses, and to render their rights vulnerable. Given the historically contentious relationship between Andean campesino water users and the government, it is very likely that this story would repeat itself throughout the highlands, adversely affecting the possibility for a negotiation process and outcome that stakeholders could willingly accept.

Third, a close analysis to the negotiation process in Parón elucidated a couple of problems that could also appear in future water conflicts in Peru. On one hand, negotiators did not always legitimately represent their constituencies.[93] There appeared to be no mechanism in place to guarantee that all water users are adequately represented. While it could be argued that it is not the government's responsibility to ensure adequate representation of negotiating parties, the case in Parón showed that it caused political instability, ultimately obstructing the negotiations. In addition, it is best to correct this representation issue to ensure that both the governance body and management plan it produces are long-lasting, received as legitimate, and respected.

On another hand, the study of the negotiation process in Parón also illuminated the difficulty, and even impossibility, of arriving at any resolution because none of the negotiators appeared to have proper knowledge of how to negotiate. For instance, fieldwork indicated that all stakeholders approached the negotiation table with preconceived, and sometimes even opposing, outcomes. IWRM is based on principles of interest-based negotiation. According to researchers, for a negotiation process to yield outcomes that actually represent all stakeholders' interests there are many requirements including: the need to plan and prepare for the process, the creation of negotiating rules, the consistency of meetings, the need for a common definition of the

[93] In this analysis, I chose not to mention the lack of representation of all stakeholders in the negotiation process. Even though there were serious issues regarding the lack of representation of Duke Energy in the negotiation process, I consider them to be a unique characteristic of this conflict. In this case, it is still debated whether Duke Energy is a water user in PL or not because while the company's infrastructure is in the watershed its use lies outside of the watershed. Hence, it is unlikely that a challenge like this will appear elsewhere in the future.

negotiation objectives and of what the process will do for them, and most of all, the need for all negotiators to be ready to compromise (Carpenter & Kennedy, 2001).

These observations were made with the objective of ultimately redirecting water governance to become more equitable than it appears to be shaping to be thus far. Fieldwork indicates that, on the ground, the new governance framework is providing new spaces for locals to voice their opinions; however, these new spaces are failing to deliver more equitable results. Rather, these spaces are further aggravating local distrust and animosity against regulatory government agencies. This, however, is not to say that 'more equitable' results are unlikely with this new framework, but rather that these depend on how the implementation is undertaken.[94] The apparent inter-agency lack of communication, the local water authority's lack of authority, sufficient funds and training has resulted in a disorderly implementation process that appears rushed, and that lacks mechanisms for transparency and accountability. It is important that critical research continues to be conducted in these areas because these deeper assessments that problematize development efforts better identify root causes for failures and provide guidance for practitioners to improve their practices.

[94] I emphasize 'more equitable' because I recognize that the extent to which this framework can become equitable is limited by politics and interests of powerful actors that lay outside this case study.

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VITA

NAME OF AUTHOR

Flavia Rey de Castro Pastor

DATE/PLACE OF BIRTH

June 26th, 1981; Arequipa, Peru

UNDERGRADUATE SCHOOLS ATTENDED

Universidad Nacional de San Agustin, Arequipa, Peru

University of North Alabama, Florence, AL

GRADUATE SCHOOLS ATTENDED

Syracuse University, Syracuse, NY

DEGREES AWARDED

Bachelor of Science in Professional Geography	2006
Masters in Public Administration	2011

AWARDS AND HONORS

Maxwell Dean's Summer Research Grant	2010-2011
John and Mable deSardon Glass Endowed Fellowship	2009-2012
Maxwell Dean's Professional Scholar Award.	2009-2012
Promising Alumni Student Award	2006
Ed Billingham Endowed Scholarship	2006
Geography Department Endowed Scholarship	2005

PROFESSIONAL EXPERIENCE

Research Assistant 2012
Department of Public Administration, Syracuse University

Teaching Assistant 2009
Department of Geography, Syracuse University

Associate GIS Specialist 2006-2009
An International Center for Soil Fertiity and Agricultural Development